

Post-Closure Plan

**CECOS International, Inc.
Aber Road Facility
Williamsburg, Ohio**

EPA I.D. # OHD-087-433-744

Revised: September 2014

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**REVISIONS TO
POST CLOSURE PLAN
CECOS INTERNATIONAL, INC.**

Date of Revision	Revision Number
December 1992	1 (Original)
September 1993	2
December 1993	3
March 1994	4 (Amended September 1994 per Ohio EPA approval)
September 2014	5
Added Rev. Summary (page vi); Revised Sections: 10.3, 10.3.2, 10.4, 10.5.1, 10.5.2.1.2, 10.5.2.1.3, 10.5.3, 10.5.4, 10.5.5, 10.6.3, 11.2.2, 11.2.4, 11.2.4.1, 11.2.4.2, 11.2.4.3, 11.2.4.4, and 11.2.5; Figure 17; Tables 4, 10, 12, and 15; Appendices F, G, H, and I	

1.0 INTRODUCTION

1.1 General Facility Information

CECOS International, Inc. (CECOS) has prepared this Post-Closure Plan in accordance with Ohio Administrative Code (OAC) 3745-55-18 and 40 Code of Federal Regulations (CFR) 264.118. This plan details how the regulated hazardous waste management units that were closed as landfills and their operational support facilities will be maintained during the post-closure period pursuant to OAC Rule 3745-55-17. This plan supersedes all previously approved post-closure plans. All post-closure requirements and activities will be performed pursuant to this plan, upon approval by the Ohio Environmental Protection Agency (Ohio EPA).

The facility was closed under interim status rules. Since the units that are the subject of this Plan operated and closed under interim status rules, there is no Part B permit for the Facility. Ohio EPA final facility standards, in particular Groundwater Compliance Monitoring and Corrective Action, sometimes refer to a "permit." Since the Facility has no such permit, where applicable and in accordance with Ohio EPA's goals for baseline facility standards, groundwater monitoring under the Post-Closure Plan complies with the final permitted facility standards in accordance with OAC Rules 3745, Chapters 54 and 55, as applicable to permitted hazardous waste facilities (See Section 10).

Pertinent facility information is provided below:

Owner/Operator:	CECOS International, Inc.
Corporate Address:	18500 North Allied Way Phoenix, AZ 85054
Corporate Mailing Address:	Director, Engineering Group 18500 North Allied Way Phoenix, AZ 85054
Facility Location:	5092 Aber Road Williamsburg, Ohio 45176
Ohio Hazardous Waste Facility Installation Number:	05-13-0011
EPA ID Number:	OHD 087 433 744

1.2 Previous Closure Activities

Closure activities were completed at the facility in accordance with the approved Resource Conservation and Recovery Act (RCRA) Facility Closure Plan, dated December 1992, September 1993, December 1993, and March 1994, and in accordance with the conditional letter of approval for the closure plan dated September 23, 1994 from Ohio EPA. These closure activities occurred in 1995. On February 12, 1997 the Ohio EPA acknowledged the completion of closure activities performed under the September 23, 1994 approved Closure Plan and OAC Rules 3745-66-12 through 3745-66-15. **Appendix A** presents the approval

letter. CECOS was directed to immediately commence conducting the scheduled post-closure activities as detailed in the facility's approved plan.

The following units were covered by the approved **Closure Plan** (complete details are presented in the April 1996 RCRA Facility Closure Report).

The following closure activities ensured that these former hazardous waste units had been decontaminated and/or had undergone remedial actions, such that they did not pose a threat to human health or the environment and do not require post-closure care:

- Container Transfer Dock - The dock met clean closure rinsate standards and requires no further action or post-closure care unless used as a 90-day storage unit;
- Access Haul Roads and Associated Ditches - Soils that contained hazardous constituents in excess of health-based clean closure levels were removed from the unit. Therefore the unit is clean closed and requires no post-closure care; and
- Old Drum Holding Area - Soils that contained hazardous constituents in excess of health-based clean closure levels were removed from the unit. Therefore the unit is clean closed and requires no post-closure care.

The following units covered in the approved **Closure Plan** did not require further action during closure and do not require post-closure care:

- Solidtek - Levels of hazardous constituents in soils within the unit met health-based clean closure levels determined by risk assessment. Therefore the unit is clean closed and requires no post-closure care;
- Truck Staging Area - Levels of hazardous constituents in soils within the unit met health-based clean closure levels determined by risk assessment. Therefore the unit is clean closed and requires no post-closure care;
- Frac Tank Area - Levels of hazardous constituents in soils within the unit met health-based clean closure levels determined by risk assessment. Therefore the unit is clean closed and requires no post-closure care;
- Storm Sewer - Analysis of water from this unit indicated that the unit met clean closure rinsate standards. Therefore the unit is clean closed and requires no post-closure care;
- Potentially Contaminated Storage Facilities (PC Ponds) - These impoundments were operated under the National Pollutant Discharge Elimination System (NPDES) program and historical analysis indicates that no hazardous waste or hazardous waste constituents have been managed in these units. Since these are not RCRA-regulated units, they require no post-closure care; and
- Equipment Wash - In 1989-1990, this unit was cleaned, retrofitted, and assessed to ensure that no release had occurred from the unit. The unit has not been used for hazardous waste activities since that time. Therefore the unit is clean closed and requires no post-closure care.

Although never used to dispose of waste, Cells 11 and 13 were constructed in the 1980s. The Cell 11 excavation was completed in October 1985. Channel sand was discovered during excavation and therefore a cell was not allowed to be constructed. The excavation was backfilled in two phases. The final capping was completed June 5, 1991. The backfill

used consisted of glacial till, intermediate till, and clay placed in loose lifts of 10-inch maximum thickness. Lifts were compacted to 90 percent of the maximum dry density (ASTM D1557 Modified Proctor). Cell 11 was never completed; therefore waste was never placed in Cell 11, it is a non-regulated unit, and does not require post-closure care.

Cell 13 was constructed in the same manner as Secure Chemical Management Facility (SCMF) 10 with a complete double liner system, underdrains, and leak detectors. Construction was completed in June of 1988. A Permit to Operate Cell 13 was not provided by Ohio EPA. Waste was never placed in Cell 13, it is not a regulated unit, and does not require post-closure care.

1.3 Current Site Status

This Post-Closure Plan amendment will address changes that have become necessary since the site entered post-closure in February of 1997, to make the remaining post-closure activities more effective and efficient, while still being protective of human health and the environment. Post-closure care will be conducted under applicable rules found in OAC 3745-54, 3745-56, and 3745-57. Care and maintenance of individual land disposal units (e.g., SCMFs) closed prior to final facility closure to be managed in accordance with this plan are:

- SCMF 3;
- SCMF 4/5;
- SCMF 6;
- SCMF 7;
- SCMF 8;
- SCMF 9; and
- SCMF 10.

Additionally, Fire Pond 1 and Fire Pond 4/5 were closed as landfills and are therefore a part of this Post-Closure Plan.

During the post-closure period, it is anticipated that several leachate handling systems will continue to be operated to provide temporary leachate storage and treatment as necessary. These units are:

- Contaminated Water Storage Tanks;
- Leachate Accumulation Tanks;
- Leachate Treatment System (Tanks);
- Truck Wash Facility; and
- Container Transfer Dock (may be used as a generator-status (less than 90 day) storage unit but as of the date of the preparation of this Post-Closure Plan submittal it has not been used as such and does not require post-closure care).

The leachate accumulation tanks and the leachate treatment system have been installed at CECOS to assist in meeting the leachate management objectives as specified in the 1987 Administrative Order by Consent between United States Environmental Protection Agency (U.S. EPA) Region 5 and CECOS. The 1987 Administrative Order by Consent has been

closed and CECOS is currently operating under U.S. EPA Region 5 Post Construction requirements of a 1994 Administrative Order by Consent.

The automatic leachate pumping system (which includes the leachate accumulation tanks) has been installed to meet the objective of maintaining the lowest practical leachate levels within the cells. The leachate treatment system has been installed to pre-treat leachate prior to off-site treatment/disposal. This pretreatment is necessary due to occasional high levels of polychlorinated biphenyls (PCBs) and suspended solids within the leachate, limiting the off-site disposal options for the leachate unless the leachate is pretreated.

The Contaminated Water Storage Tanks, Leachate Accumulation Tanks, and Truck Wash Facility will be operated as less-than-90 day storage systems in accordance with OAC Rule 3745-52-34(A) and 40 CFR 262.34(a). The Container Transfer Dock may be operated as a less-than-90 system if needed. The Leachate Treatment Tanks will be operated pursuant to OAC Rule 3745-55. The hazardous waste management units that will remain operational during post-closure are equipped with secondary containment. Section 6 of this Post-Closure Plan describes the closure procedures that will be implemented for the post-closure hazardous waste units when they are removed from service or after the post-closure period ends, whichever is sooner. Additional details on the leachate storage and treatment units are provided in Section 1.5.

1.3.1 CMI Areas

CECOS submitted to the U.S. EPA Region 5 the Corrective Measures Implementation Construction Completion (CMI CC) Report on March 11, 1998 followed by a revision on July 6, 1998. U.S. EPA approved the CMI CC Report on August 4, 1998 and instructed CECOS to begin post construction operations and maintenance. **Appendix B** presents the U.S. EPA approval letter. The corrective measures installed included:

- A groundwater control vertical barrier slurry wall surrounding the pre-RCRA disposal units Cells 1 and 2 and Intermediate Landfill as well as Fire Pond 1, SCMF 3, and SCMF 4/5;
- A low permeability synthetic cap system over the Intermediate Landfill and Fire Pond 1;
- A leachate extraction system at the Intermediate Landfill; and
- A gradient control system of wells and trenches to pump groundwater.

The units regulated by the CMI Administrative Order of Consent are:

- The Sanitary Landfill;
- The Intermediate Landfill;
- Cell 1; and
- Cell 2.

During post construction operations and maintenance, leachate and groundwater handling systems (as needed) will continue to be operated to provide temporary leachate or groundwater storage. These units are:

- CMI Leachate tank; and
- CMI Groundwater tanks.

CECOS is conducting post-construction operating and maintenance (O&M) as approved by U.S. EPA Region 5, RCRA Division for the CMI areas. Therefore, the CMI areas are not addressed in this Plan. The O&M requirements include groundwater monitoring, performance monitoring, and leachate and groundwater collection and disposal. References to these activities will be made in the appropriate sections.

Monitoring wells currently installed on-site as of the submittal of this Post-Closure Monitoring Plan may be found on **Figure 1**.

1.4 Post-Closure Unit Descriptions

During the RCRA operating life of the Aber Road Facility, the design and construction criteria of the SCMFs was continually updated to reflect the state-of-art engineering techniques and the changing hazardous waste regulations. Consequently, each SCMF at CECOS is constructed differently from the next as a result of the changing technology. A brief description of the construction of each SCMF is provided as a guide for following which monitoring, inspection, and maintenance criteria outlined in this Post-Closure Plan apply. **Figure 2** indicates the location of each of these closed units as well as the generator-status leachate management units described above.

Leachate generated at the site from units that received PCB wastes is regulated under generator-status requirements by U.S. EPA Region 5, Toxic Substances Control Act (TSCA) Branch. There are also requirements to monitor groundwater and surface water for PCBs. These requirements are regulated by the U.S. EPA Region 5, TSCA Branch. PCBs were received in SCMFs 3, 4/5, 6, 7, 8, 9, and 10.

The following items will no longer be sampled as a component of the Post-Closure Plan. However, per the U.S. EPA TSCA Program, surface water locations C-2, C-6, C-9, C-10, and C-12, as well as the leak detectors under SCMF 9 and 10, and underdrains under SCMFs 3, 4/5, 6, 7, 8, 9, and 10 will continue to be sampled for volatile organic compounds (VOCs), total organic carbon (TOC), and PCBs. This information will be provided to Ohio EPA for informational purposes. Should the USEPA TSCA program no longer require this monitoring to occur or change frequency requirements, Ohio EPA will evaluate the need to continue a similar monitoring program under the Post-Closure Plan.

Table 1 summarizes the leachate standpipes, underdrains, and leak detector risers associated with each SCMF. Section 10 of the Post-Closure Plan presents a discussion of the Detection Monitoring Program (DMP) as a basis for the post-closure groundwater monitoring program. Surface water monitoring will be handled under a site-wide NPDES permit, as appropriate, under the direction of the Ohio EPA's Surface Water Division and/or as required by TSCA.

1.4.1 SCMF 3

SCMF 3 is located east of the Intermediate Landfill, southeast of Cell 2, and occupies approximately two acres (See **Figure 2**). Construction of SCMF 3 began July 10, 1978 and concluded March 8, 1979, with operations beginning on March 22, 1979. A series of eight,

4-inch perforated polyvinyl chloride (PVC) pipes set within a 6-inch sand blanket were installed as part of an underdrain system that met regulations promulgated under TSCA. The TSCA underdrains were constructed on the floor of the cell excavations, beneath the constructed cell. Immediately overlying the underdrain, 5 feet of recompacted soil was placed on the bottom of the cell. A 30-mil, nylon-reinforced Hypalon (TM) liner (nylon scrim-reinforced, chlorosulfinated polyethylene) was installed (solvent-welded seams) over the bottom and side walls and secured by an anchor trench running around the perimeter of the disposal cell. Both the liner and the PVC underdrain system were assembled using organic solvent-based glues.

Three subcells were partitioned using 4-foot thick clay berms for receiving amphoteric materials, heavy metals, and general wastes. A 24-inch, precast, perforated concrete leachate collection standpipe was installed within each subcell (L-3, L-4, and L-5).

Final closure of SCMF 3 was completed in March 1981. The cap was constructed of 3-feet of recompacted soil followed by a 20 mil PVC liner, which was attached to the primary synthetic liner around its perimeter. A 2.5-foot layer of soil was placed over the entire cell and graded to a 7 percent slope. Vegetative ground cover was established to control run-off and infiltration. A gas venting system was installed within the 3-foot compacted soil cap beneath the synthetic liner.

1.4.2 SCMF 4/5

SCMF 4/5 is located between SCMF 3 and the Sanitary Landfill, southeast of the Intermediate Landfill and occupies approximately 3.7 acres (See **Figure 2**). Construction of SCMF 4/5 began in July 1979 and was completed in February 1980 with disposal operations commencing within the same month.

Originally designed as two separate units, SCMF 4/5 was constructed as a single unit in order to make the most efficient use of available space. A TSCA underdrain system was constructed on the floor of the cell and consisted of a series of 4-inch perforated PVC collection pipes tied to an 8-inch truss wall and riser pipe (U-9, U-10, U-11, and U-12). The TSCA underdrains were constructed on the floor of the cell excavations, beneath the constructed cell. The underdrain collection system was then covered with a 6-inch thick sand blanket. A 5-foot thick liner of recompacted soil was then placed over the cell walls and floor. A 30-mil Hypalon (TM) liner (solvent-welded seams) was installed over the recompacted soil liner system and secured by an anchor trench around the perimeter of the cell. Both the liner and the PVC underdrain system were assembled using organic solvent-based glues.

Three subcells were partitioned using 4-foot clay berms. The cells were used for separating amphoteric materials, heavy metals, and general wastes, respectively. A total of four, 24-inch, precast, perforated concrete leachate collection standpipes were installed in the cell (L-6, L-7, L-8, and L-9).

Final capping of SCMF 4/5 took place in October 1981. The cap was composed of a 3-foot thick recompacted soil layer overlain by a 20 mil PVC synthetic liner which was secured to the primary liner around its perimeter using adhesive chalking compounds. A 2.5-foot cover of soil was placed over the synthetic liner and graded to a slope of 7 percent. A gas

venting system was installed within the 3-foot compacted soil cap and ground cover was established to control erosion and infiltration.

1.4.3 SCMF 6

SCMF 6 is located adjacent to the eastern side of SCMF 3, along the northern boundary of the permitted area and occupies approximately five acres (See **Figure 2**). Construction of the unit began in September 1980 and was completed in April 1981, with operations commencing within the same month. A TSCA underdrain system composed of a series of four, 4-inch perforated PVC pipes set in a 6-inch sand blanket with a connecting 6-inch acrylonitrile butadiene styrene (ABS) trussed wall riser pipe was installed on the floor of the cell (U-13, U-14, U-15, and U-16). The TSCA underdrains were constructed on the floor of the cell excavations, beneath the constructed cell. The PVC underdrain system was assembled using organic solvent-based glues. A 5-foot thick recompacted soil liner was then installed on the cell floor and sidewalls, a 60-mil thick high density polyethylene (HDPE) synthetic liner was secured to an anchor trench around the circumference of the cell, and a 2-foot compacted soil buffer was placed over the underdrain system on the floor and the sidewalls of the cell. The liner was assembled using extrusion welds.

Three subcells were partitioned with 4-foot thick clay berms for segregating amphoteric materials, heavy metals, and general wastes. Five, 36-inch, reinforced, precast, perforated concrete leachate collection standpipes were installed: one in the amphoteric materials subcell, two in the heavy metals subcell, and two in the general subcell (L-10, L-11, L-12, L-13, and L-14). The subcells were reconfigured twice in order to enlarge the heavy metal subcell and to decrease the size of the amphoteric subcell.

Final closure of SCMF 6 took place in August 1983. The closure cap consisted of 3-feet of recompacted soil, a 20-mil PVC synthetic liner attached to a primary synthetic liner using adhesive caulking compounds, and a 2.5-foot cover soil in which ground cover was established to control erosion and infiltration. The cap has a gas venting system and a drainage sand blanket with shoulder drains to facilitate drainage. The finished slope of the cap is approximately 7 percent.

1.4.4 SCMF 7

SCMF 7 is located adjacent to the eastern side of SCMF 6, along the northern boundary of the permitted area and occupies approximately 6.3 acres (See **Figure 2**). Construction of the unit began in June 1981 and was completed in August 1982 with disposal operations commencing in November 1982.

A TSCA underdrain system composed of 4-inch perforated PVC pipes connected to an 8-inch ABS trussed wall and riser pipe were installed on the floor of the cell and set in a 6-inch sand blanket (U-17, U-18, U-19, and U-20). The TSCA underdrains were constructed on the floor of the cell excavations, beneath the constructed cell. The PVC underdrain system was assembled using organic solvent-based glues. Five feet of recompacted soil and an 80-mil HDPE synthetic liner were then placed over the underdrain system. The liner was assembled using extrusion welds.

The cell was partitioned into three subcells with 4-foot thick clay berms for segregating amphoteric materials, heavy metals, and general wastes. A total of five, 36-inch,

reinforced, perforated concrete leachate collection standpipes were installed within SCMF 7: one in the amphoteric materials subcells, three in the heavy metals subcells, and one in the general waste subcell (L-15, L-16, L-17, L-18, and L-19). The subcells were reconfigured once during operations in order to expand the heavy metals subcell and reduce the size of the general subcell.

Final closure of SCMF 7 was completed in June 1984. The cap was constructed using 3 feet of recompacted soil overlain by 20-mil PVC synthetic liner secured to the perimeter of the primary HDPE liner with adhesive chalking compounds. A 6-inch sand drainage blanket was placed over the synthetic liner followed by a final cover of 2.5 feet of soil in which ground cover was established to control erosion and infiltration. The cap has a finished slope of 7 percent and includes a gas venting system.

1.4.5 SCMF 8

SCMF 8 is located in the northwest corner of the upper northeast portion of the permitted area and occupies approximately 6.9 acres (See **Figure 2**). Construction of the unit began in July 1983 and was completed in December 1983. Operations at SCMF 8 commenced in June 1984.

A TSCA underdrain system was constructed on the floor of the cell and was composed of a series of perforated PVC pipes connected to a 10-inch ABS truss/wall and riser pipe (U-21, U-21A, U-22, and U-22A). The TSCA underdrains were constructed on the floor of the cell excavations, beneath the constructed cell. The underdrain system was then covered with a 6-inch sand blanket followed by 5 feet of recompacted soil. The PVC underdrain system was assembled using organic solvent-based glues.

An 80-mil HDPE synthetic liner was installed (using extrusion welds) over the sidewalls and cell floor and secured with an anchor trench around the perimeter of the cell. A leachate collection system was constructed on top of the HDPE liner and was composed of five, 36-inch, precast concrete leachate standpipes, each fed by a series of 4-inch perforated ABS collector pipes arranged in radial fashion (L-20, L-21, L-22, L-23, and L-24). The collector pipe system was covered with an 18-inch sand blanket. L-21 and L-22 as well as L-23 and L-24 are connected above the HDPE liner.

Following completion of construction, the cell was partitioned into three subcells using 4-foot clay berms for segregating amphoteric materials, heavy metals, and general wastes. The subcells were configured so that there were two leachate standpipes and collector systems in the general wastes and heavy metals subcells and a single standpipe and collector system within the amphoteric subcell.

Final capping of SCMF 8 took place in February 1985. The cap was constructed of 3 feet of recompacted soil, a 40-mil HDPE synthetic liner secured to the perimeter of the primary liner (thermal welded), and a 6-inch sand drainage blanket. A 2.5-foot soil cover was placed over the cap in which ground cover was established to reduce erosion and infiltration. The cap is fitted with a gas venting system and has a finished slope of 7 percent.

1.4.6 SCMF 9

SCMF 9 is located immediately east of SCMF 8, in the upper northeast corner of the site and occupies approximately 6.9 acres (See **Figure 2**). Construction of SCMF 9 began in August 1984 and was completed in March 1985.

A TSCA underdrain system (4-inch ID ABS solvent welded, U23 and U24) was constructed on the floor of the cell (beneath the constructed cell) over which two recompacted soil liners were lain. The two liners have a total thickness of 6.5 feet and are separated by a leak detection system composed of a series of perforated ABS pipes (solvent welded) within a sand blanket (LD-1 and LD-2). The ABS pipes are ultimately connected to a series of riser pipes along the perimeter of the cell. The ABS underdrain system was assembled using organic solvent-based glues. An 80-mil HDPE synthetic liner was installed and secured with an anchor trench around the perimeter of the cell. The liner was assembled using hot wedge and extrusion welds. A leachate collection system was constructed on top of the synthetic liner and was composed of three, 36-inch concrete leachate standpipes fed by a series of perforated collection pipes extending across the cell floor and walls (L-25, L-26, and L-27). A total of eight contingency leachate removal side riser pipes were fitted along the cell sidewalls.

SCMF 9 was partitioned into three subcells with four-foot thick clay berms for segregating amphoteric materials, heavy metals, and general waste. Each of the three subcells includes a leachate standpipe and collection system. After several layers of waste had been emplaced, the heavy metal and general subcells were reconfigured. The heavy metal subcell was enlarged to include one-half of the original general waste subcell. An additional 80-mil HDPE liner was installed over the newly defined heavy metal subcell and a series of leachate collection pipes were installed with the converted cell and connected to the heavy metal subcell standpipe.

Final capping of SCMF 9 commenced in April 1987 and was completed in August 1987. The cap consists of a 3-foot layer of recompacted soil, an 80-mil HDPE synthetic liner attached by thermal weld to the perimeter of the primary liner, a 6-inch thick drainage sand blanket, and a 3-foot thick soil cover. The cap has a gas venting system and was graded to a finished slope of 7 percent. Ground cover was established to control erosion and infiltration.

1.4.7 SCMF 10

SCMF 10 is located immediately south of SCMF 9 in the northeastern portion of the site and occupies approximately 6.4 acres (See **Figure 2**). Construction at SCMF 10 began in October 1985 and was completed in September 1986 with the first waste stream being placed in the unit on October 24, 1986.

A TSCA underdrain system was constructed on the bottom of the cell using 6-inch HDPE piping (U-25 and U-26). The TSCA underdrains were constructed on the floor of the cell excavations, beneath the constructed cell. The HDPE underdrain system was assembled using friction coupling. The underdrain piping on the bottom of the cell was then covered with a sand blanket and a 70-ounce non-woven geotextile fabric to serve as a filter. A recompacted soil liner was then placed over both the sidewalls and cell bottom, covering the underdrain system. On top of this soil liner, a secondary synthetic liner of 80-mil HDPE

was placed over the floor of the cell and extended 12 feet up the sidewalls. The liner was assembled using extrusion welds. On top of the secondary synthetic liner, a leak detection system was assembled (LD-3 and LD-4).

The leak detection system was composed of collection pipes set within a sand blanket on the bottom of the cell and non-woven geotextile fabric on the sidewalls. The geotextile fabric on the sidewalls functions as a collection blanket, thus providing leak detection for the sidewalls. A second recompacted soil liner was placed over the cell floor and sidewalls. A primary synthetic liner of 80-mil HDPE that covered the cell bottom and sidewalls was installed (using extrusion welds) over the second soil liner, and secured around the perimeter of the cell by an anchor trench. A leachate collection system was installed on top of the primary liner and was composed of perforated HDPE collection pipes and a sand blanket on the bottom of the cell and a polyethylene drainage net protected by a geotextile filter on the sidewalls. The collector pipes connect three, 36-inch diameter perforated concrete leachate collection standpipes (L-34, L-35, and L-36). Each standpipe is fitted with a geotextile filter and set within a gravel envelope. SCMF 10 was partitioned into three subcells with 4-foot thick clay berms for segregating amphoteric materials, heavy metals, and general waste. There is a standpipe in each subcell. The subcells were reconfigured once during operations in order to expand the heavy metals subcell and reduce the size of the general subcell.

Final capping of SCMF 10 commenced in August 1989 and was completed in December 1989. The cap consists of a 3-foot layer of recompacted soil, an 80-mil HDPE synthetic liner attached by thermal weld to the perimeter of the primary liner, a 6-inch thick drainage sand blanket, and a 3-foot thick soil cover. The cap has a gas venting system and was graded to a finished slope of 7 percent. Ground cover was established to control erosion and infiltration.

1.4.8 Fire Pond 1

Fire Pond 1, a surface impoundment operated and closed prior to final site closure activities, was located in the northwest portion of the Aber Road Facility, surrounded on three sides by Cells 1 and 2, SCMF 3, and the Intermediate Landfill (See **Figure 2**). This impoundment was excavated as a shallow trench, approximately 8 feet deep, during the construction of Cell 1 in early 1977. Fire Pond 1 was initially used to contain water for fire fighting as required by early permits. Because of the low permeability of the soil in which the impoundment was excavated, no synthetic liner was installed. In 1980, an adjacent impoundment, Fire Pond 2, was integrated into Fire Pond 1 by the removal of a separation berm.

As storage capacity for fire fighting activities increased elsewhere on-site, Fire Pond 1 was eventually used to store potentially contaminated rainwater from Cell 2 and SCMFs 3 and 4/5. In addition to rainwater, leachate from closed cells (Cell 2, SCMFs 3, 4/5, 6, 7, 8, and 9) was pretreated and temporarily stored there. Contaminated fluids were solidified on-site or removed and transported to off-site facilities. The use of Fire Pond 1 as a surface impoundment for fire fighting or for temporary storage of contaminated liquids was discontinued in October 1985.

In October 1985, the free liquids were removed from Fire Pond 1. From 1985 to the initiation of closure activities in April 1989, Fire Pond 1 contained liquids primarily due to precipitation. Liquids, sludges, and potentially contaminated soils were removed in 1989.

Due to the inability to clean close this unit, it was backfilled with clean site soil, capped, and closed as a landfill in 1989/1990. The Fire Pond 1 cap system placed above the fill consists of a minimum of 3-feet of clay and 6 inches of topsoil. Since this unit was not originally constructed as a landfill, there are no liners, leak detection, or leachate collection systems.

During the U.S. EPA Region 5 directed CMI, an improved cap was installed over Fire Pond 1. Installation began in August 1997 and included a 2-foot minimum of compacted clay, a 40-mil LDPE synthetic liner, geonet/geotextile drainage layer, 18 inches of fill and 6 inches of topsoil. The area was seeded in October 1997 in order to establish groundcover to control erosion and infiltration.

1.4.9 Fire Pond 4/5

Fire Pond 4/5 was constructed in August 1979, so that Fire Pond 3, which was within the limits of the excavation of Cell 4/5, could be closed (See **Figure 2**). The original purpose of Fire Pond 4/5 was to store water for use in the event of an emergency in Cell 4/5. Beginning in 1980, water from the surface of active cells was stored in Fire Pond 4/5 prior to being discharged through a spray irrigation system. Surface water from active SCMFs 3, 4/5, 6, 7, 8, and 9 was stored in Fire Pond 4/5. The active use of Fire Pond 4/5 ceased in October 1985. From 1985 until closure of the fire pond as a landfill, Fire Pond 4/5 received and stored only precipitation that fell within its bounds (see CECOS RCRA Facility Closure Plan, September 1993).

Prior to closure, Fire Pond 4/5 measured approximately 270 feet long, 180 feet wide and 13 feet deep. The capacity of Fire Pond 4/5 was approximately 3,200,000 gallons, which included 2 feet of free board. Fire Pond 4/5 was constructed using the natural till soils as a base. The fire pond was constructed in glacial till soils which overlie finer grained lacustrine sediments. These glacial till soils have been visually classified as sandy silt with some gravel. The fine grained deposits consist of red-brown mottled silt clay with trace amounts of sand and gravel.

As described in the September 1993 CECOS RCRA Facility Closure Plan, Fire Pond 4/5 was closed as a landfill, in accordance with OAC Rule 3745-67-28(A)(2). Prior to construction of the cap, Fire Pond 4/5 was brought to grade with gravel, crushed aggregate, and clean soil fill. The cap was then constructed of 2 feet of compacted clay, a 40 mil HPDE FML liner, a 1 foot drainage layer, a geotextile liner, 18 inches of general fill, and 6 inches of top soil. The area was then vegetated using the seed mixture recommended by the Clermont County Soil and Water Conservation District. Since Fire Pond 4/5 was not originally constructed as a landfill, there are no liners, leak detection, or leachate collection systems.

1.5 Leachate Treatment and Storage Units

The Container Transfer Dock, Leachate Accumulation Tanks, Contaminated Water Storage Tanks, and Truck Wash Facility are generator-status hazardous waste units that will

support the leachate management program and other activities during the post-closure period. The leachate treatment system will be operated pursuant to the provisions of OAC Rule 3745-55 and the Post-Closure Plan.

The Leachate Accumulation Tanks, Contaminated Water Storage Tanks, and the Truck Wash Facility utilized by CECOS at the site are operated under the hazardous waste standards for less-than-90 day storage units. The Container Transfer Dock underwent closure per the requirements in the CECOS Closure Plan and can be operated during post-closure as a generator-status container storage area. Thus, these post-closure storage units are exempt from the closure plan requirements, and therefore post-closure requirements, per OAC Rule 3745-52-34(A)(1). However, CECOS will, upon discontinuation of the use of the Leachate Accumulation Tanks, Contaminated Water Storage Tanks, the Truck Wash Facility, or the Container Transfer Dock, close these units in conformance with OAC Rule 3745-66-11 (closure performance standards) and OAC Rule 3745-66-14 (decontamination and disposal requirements) and Section 6 of this Plan.

The following presents a brief description of each of the hazardous waste units that will remain in use through the post-closure period.

1.5.1 Truck Wash Facility

The Truck Wash Facility is located as shown on **Figure 2**. A 2,800-ft² steel frame building houses the truck wash. A 7,540-gallon in-ground lined tank (trench) collects wash and rinse water draining off of the trucks and the sloped concrete pad. The trench has secondary containment and a leak detection system. The trench liner consists of steel surrounded by a sand and geomembrane liner/leak detection system set into a concrete trench. Both contaminated equipment and vehicles are washed using this facility. All water and solids collected in the trench are managed as multi-source hazardous waste leachate (F039) wastewater or solids, and shipped off-site for treatment/disposal.

1.5.2 Contaminated Water Storage Tanks

The Contaminated Water Storage Tank system includes two 250,000-gallon carbon steel elevated tanks, one sump pump, two water pumps, concrete secondary containment, and interconnecting piping and valves. The tanks (T102 and T103) are located as shown on **Figure 2**. The tanks have been designed and are operated in accordance with OAC Rules 3745-55-90 through 3745-55-99 and 40 CFR 264 Subpart J. The tanks are approximately 40 feet in height with an outside diameter of 36 feet. These two tanks store contaminated water (leachate) for less than 90 days. Tanks T102 and T103 are used to store site leachate (for less than 90 days) prior to shipment off-site for further treatment or disposal. Each tank is equipped with an automatic high level emergency shut off that activates when liquid levels within the tank reach approximately one foot from the top of the tank.

The secondary containment structure is a monolithic pour concrete structure free of construction, control or contraction joints and is coated with an epoxy seal. PVC waterstops are installed at the wall joints. The floor of the secondary containment area is sloped to a floor sump at southeast corner of the unit. Any liquid accumulating in the sump is pumped automatically to one of the tanks (via a float activated switch).

The secondary containment system has the capacity to contain the volume of the largest tank (250,000 gallons) and precipitation run-off generated from a 25-year 24-hour storm event (16,700 gallons) while still maintaining a 1-foot freeboard. Overall capacity of the containment system is calculated to be 339,000 gallons.

1.5.3 Leachate/Groundwater Accumulation Tanks

There are seven Leachate Accumulation Tanks that are used for the collection and storage (all for less than 90 days) of leachate. All of the tanks are 7,500 gallons, with the exception of T112 which is a 10,000 gallon tank. All of the tanks are horizontal saddle-supported reinforced fiberglass construction that is provided with reinforced concrete secondary containment. The concrete secondary containment structures have been coated with an epoxy seal and are equipped with PVC water stop at the joints. The tanks have been designed and are operated in accordance with OAC Rules 3745-55-90 through 3745-55-99 and 40 CFR 264 Subpart J.

Leachate is pumped automatically from each leachate collection system standpipe to one of the tanks. **Table 2** provides a list of each leachate accumulation tank (T104, T105, T108, T109, T110, T111, and T112), its size, location, secondary containment volume, and the associated leachate standpipe. Although the standpipe-to-tank piping presented in **Table 2** is a best engineering design based on location, the changing characteristics of leachate and the availability of treatment/disposal outlets may require changes in the piping-to-tank designation. Overall leachate management practices will remain consistent with this Post-Closure Plan; therefore, revisions in the standpipe-to-tank piping arrangement will not necessitate a revision to the Post-Closure Plan.

During the CMI, new tanks were installed in a new building west of Fire Pond 1, as shown on **Figure 2**. Three 25,000-gallon tanks (T-202A, T-202B, and T-203) store groundwater pumped from inside the slurry wall and one 7,500-gallon tank (T-204) stores leachate pumped from Cells 1, 2, and the Intermediate Landfill. All of these tanks are operated as less-than-90 day storage tanks, with the groundwater and leachate pumped from the tanks to tanker trucks for off-site disposal without any on-site treatment. The groundwater and leachate pumped into these tanks are regulated by U.S. EPA Region 5.

The following pairs of Leachate Accumulation Tanks are located within individual secondary containment structures: T111 and T112, T109 and T110, and T104 and T105. Tank T108 is a single tank location with its own secondary containment structure. **Figure 2** shows the location of each leachate accumulation point that corresponds to the location of each secondary containment structure.

Each of the tanks, including T-202A, T-202B, T-203, and T204 is equipped with float activated high level warning and cutoff switches. For tanks T108, T109, T110, T111, and T112 the high level alarm is activated when leachate reaches 18 inches from the top of the tank, the cut-off switch is activated at 12 inches from the top of the tank. For tanks T104 and T105 the high level is activated when leachate reaches 16 inches from the top of the tank, and the cut-off switch is activated at 10 inches from the top of the tank. Additional details on the leachate management program are provided in Section 2.

1.5.4 Leachate Treatment System

The leachate treatment system is designed to remove PCBs and suspended solids from the leachate to facilitate off-site leachate disposal. The leachate is first pumped to a settling tank to separate oils and solids from the leachate. The leachate is then pumped to a multi-chambered reactor unit (treatment tank) where the pH is first lowered with sulfuric acid then raised with lime slurry. An anionic polymer is then added to the leachate which results in the flocculation of solids. The leachate and solids then flow to a clarifier where solids are removed and pumped to a filter press. The treated leachate is pumped into storage tanks (T102 and T103) prior to shipment off-site for disposal. Additional details on the leachate treatment system are provided in Section 2.4.

1.5.5 Container Transfer Dock

The Container Transfer Dock is a hazardous waste management unit that was used to store containerized hazardous waste prior to disposal in one of the SCMFs. The unit was in operation from March 1985 through 1988 for storage of waste received off-site, consolidation of liquid wastes, and solidification of liquids and sludges. Following 1988, the Container Transfer Dock was used for storage of wastes generated on-site for 90 days or less, in accordance with OAC Rule 3745-52-34(A). The Container Transfer Dock was closed per the requirements in the CECOS Closure Plan and can be operated during post-closure as a generator status container storage area, per OAC Rule 3745-52-34.

1.6 Facility Contacts

The person identified below will serve as CECOS' facility contact and will be responsible for the following aspects of this Post-Closure Plan:

- Preparing amendments to this plan in accordance with OAC Rule 3745-55-18(D) and 40 CFR 264.118(d);
- Execution and submittal of the post-closure certification statements on behalf of CECOS, which are also signed by a qualified professional engineer in accordance with OAC Rule 3745-55-20 and 40 CFR 264.120;
- Updating the cost estimate for post-closure in accordance with OAC Rule 3745-55-44(B) and 40 CFR 264.144(b); and
- Preparing and submitting CECOS' annual financial assurance documents for post-closure in accordance with OAC Rule 3745-55-45 and 40 CFR 264.145.

The Aber Road facility post-closure contact is:

Director, Engineering Group
18500 North Allied Way
Phoenix, AZ 85054
(480) 627-2700

1.7 Maintenance of and Amendments to the Post -Closure Plan

The plan will be available for review at all reasonable times at the Aber Road Facility in the administration offices. In accordance with OAC Rule 3745-55-18(C) and 40 CFR

264.118(c), CECOS will provide a copy of the approved Post-Closure Plan and all revisions to the Plan upon request of U.S. EPA or Ohio EPA, including requests by mail. CECOS will amend the Post-Closure Plan (by submitting the amended Plan and a written request to amend the Plan to the Ohio EPA Director) whenever:

- Changes in operating plans or facility design affect the Post-Closure Plan; or
- Events occur, including partial and final closures, which affect the Post-Closure Plan.

CECOS will amend the Post-Closure Plan (and request approval from Ohio EPA of the amended Plan) at least 60 days prior to the proposed change in facility design or operation, or no later than 60 days after an event has occurred which has affected the Post-Closure Plan.

Furthermore, CECOS will obtain prior authorization from the Director of the Ohio EPA, pursuant to OAC Rule 3745-27-13, to engage in filling, grading, excavating, building, drilling, or mining on land where a SCMF or unit closed as SCMF unit was operated.

1.8 Records Maintenance and Retention Activities

Records as required by OAC Rules 3745-52-40 and 3745-54-73 will be maintained electronically and/or in hard copy format throughout the post-closure care period using reasonable care to protect them. These records can be relocated from the CECOS Aber Road site upon notification to Ohio EPA. In accordance with OAC Rule 3745-50-58(H), CECOS will furnish the Director, within a reasonable time, any relevant information requested to determine compliance with the approved monitoring plan, including copies of records required to be kept regarding groundwater monitoring and statistical evaluations.

To meet and exceed OAC Rules 3745-50-58(J)(2) and 3745-54-73(B)(6), records will be maintained at the site of all monitoring information (including calibration and maintenance records and testing and analytical data), copies of all reports required by the plan, certification required by paragraph (B)(9) of Rule 3745-54-73, and corrective action or cleanup activities (if required) throughout the post-closure period. The post-closure care period may be extended as discussed in Section 8.0. Records will be maintained during any extended period. The site will also maintain records from all groundwater monitoring wells and associated groundwater surface elevations for the post-closure care period. Per OAC Rule 3745-54-97(J), all groundwater statistical data will be maintained at the facility in the operating record through the post-closure care period.

2.0 LEACHATE MANAGEMENT PLAN

This section describes the leachate management program that will continue through the post-closure period, pursuant to OAC Rule 3745-55-18(B). Throughout the post-closure period, leachate will continue to be collected, analyzed, removed, and treated (if necessary) from the closed SCMFs at the facility, and shipped off-site for disposal according to the procedures described herein.

The leachate is designated as RCRA multi-source hazardous waste leachate (F039 wastewater). Historically the waste leachate has also been identified as potentially carrying various hazardous characteristic waste codes (D-codes) due to elevated concentrations of metals and organic compounds. A secondary waste stream generated due to operational handling and treatment of the F039 wastewater leachate is leachate solids and debris (F039 nonwastewater). These waste streams consist of sediment and operational debris and sludge (filter cake) generated during the leachate pumping and treatment processes. Waste solvent (D001) may also be generated at the facility in the maintenance shop.

The 1987 Administrative Order by Consent between CECOS International, Inc. and U.S. EPA Region 5 identifies several interim measures to be performed by CECOS. These interim measures required, in part, that CECOS reduce the leachate levels in SCMFs 3 through 8. In response to this requirement, CECOS implemented two design and construction projects that have effectively reduced the leachate head levels in the closed units. The two projects are:

- Leachate Accumulation Points (LAP) - automated leachate pumping and tank collection systems have been installed for the pre-Hazardous Waste and Solid Waste Amendments units. SCMFs 9 and 10 had existing systems installed at the time of the closure in these units. This leachate pumping system is described in detail in Section 2.3.
- Leachate Treatment System (LTS) - because of TSCA regulatory constraints on PCB levels in liquid waste, several standpipes could not be pumped or regularly pumped since no TSCA permitted treatment outlet was available. A treatment system was installed to maximize the separation of PCB containing phases of leachate from the primarily aqueous phase. This treatment system allows the facility to pump all standpipes regardless of the PCB concentrations. The leachate treatment system is described in detail in Section 2.4.

2.1 Leachate Standpipe Monitoring

Waste characterization (for on-site pretreatment and off-site treatment/disposal) and land disposal restriction (LDR) compliance are the main considerations in deciding which waste parameters are to be monitored. The leachate waste is stored in tanks and drums. Long-term compatibility concerns with tank and drum materials have been addressed through historical operations experiences. Tanks are typically constructed with fiberglass or coated steel interiors. Historically, drummed leachate liquids and solids have shown no incompatibility with the drums in which they were contained. Therefore, there is no need to monitor waste characteristics for incompatibilities with storage structures.

On June 1, 1990, U.S. EPA published the Land Disposal Restrictions for Third-Third Scheduled Wastes (55 FR 22520). This final rule not only defined multi-source leachate

and assigned it waste number F039, it set forth a list of treatment standards that the F039 wastes must meet in order to be land disposed. The list is composed of over 200 constituents with corresponding treatment standards. These lists are found at OAC Rule 3745-270-40 (40 CFR 268.40).

Historically, the leachate from the standpipes listed on **Table 1** was sampled and analyzed for the compounds contained on the list in OAC Rule 3745-270-40 for the F039 and the D-code wastes. CECOS believes that sampling from the final effluent from the treatment system will provide more representative data as it relates to characterization of the leachate for disposal. Therefore, starting with the approval of this Post-Closure Plan amendment CECOS will collect a sample from the final effluent on an annual basis (CECOS will continue to collect leachate pumping data on a daily basis for each standpipe). The annual sample collected from the final effluent will be analyzed for the compounds contained on the list in OAC Rule 3745-270-40 for the F039 constituents and the D-code wastes per EPA-approved procedures. It should be noted that the sampling of the leachate is for disposal purposes.

Additionally, leachate nonwastewaters and waste solvent generated at the maintenance shop will be sampled and analyzed as necessary to assist in evaluating waste treatment/disposal options and for completing treatment, storage, and disposal facility (TSDF) Waste Profile Sheets.

Should the leachate waste generation process change, CECOS will determine whether the leachate characteristics have changed. First, CECOS will obtain as much information about the process change as possible and an unscheduled sample will be taken and analyzed according to EPA-approved methods. Any non-routine parameters that are suspected to be present will also be measured. If a change is detected, CECOS will make every effort to identify the cause. Should the treatment system no longer be necessary, leachate will be sampled from the leachate accumulation tanks for characterization at disposal outlets.

2.2 Leachate Sampling and Analysis

Post-closure monitoring of leachate is being performed primarily in accordance with the RCRA requirements and will therefore follow RCRA (specifically U.S. EPA SW-846) sampling and analytical procedures. The specific sampling and analytical procedures to be utilized by the Aber Road facility are discussed below.

2.2.1 Leachate Sampling

The F039 wastewaters will be sampled from tank T-3 after it has been through the treatment unit.

F039 nonwastewaters, which will be sampled and analyzed only as necessary for disposal purposes, are generated in the leachate pretreatment system, sumps, and trenches and will be contained in drums or roll-off boxes. If contained in drums, the specific drums to be sampled will be selected using simple random sampling methodology as presented in SW-846, Section 9.2. Waste contained in roll-off boxes will be gridded off and randomly sampled.

Sample aliquots will be drawn from the leachate as it drops into tank T-3 directly into the appropriate sample containers for analysis by an off-site laboratory. Samples are collected directly into sample jars as the leachate drops into tank T-3. Since the waste is homogeneous, a representative sample can be obtained even though the sampler is limited to a single vertical area. Summaries of the sampling methods are shown on **Table 3**.

Sampling equipment will be handled in a manner to prevent contamination from outside sources. Surfaces that will be in contact with the sample will be thoroughly cleaned with deionized water, handled with disposable PVC or latex gloves, and capped or stored in plastic until use.

2.2.2 Leachate Analysis

The F039 wastes will be analyzed with respect to their proper characterization and LDR compliance. **Table 4** lists the analytical test methods for each parameter. All test methods listed are EPA-approved. Qualified off-site laboratories will perform the analyses.

2.2.3 Sample Containers

Only new sample containers will be used for collection of samples. Appropriate container type and preservatives will be selected for each analyte. All containers will be new, pre-cleaned and capped by the manufacturer, distributor, or laboratory prior to use. The containers will be shipped to CECOS in sealed coolers.

The sample in each container may be analyzed for several constituents or parameters, provided the sample is of adequate volume and appropriate preservation and handling considerations have been employed.

2.2.4 Sample Preservation

Pre-preserved bottles will be shipped from the analytical laboratory. The analytical laboratory will preserve bottles in accordance with SW-846 methodology. Once collected each sample will be stored in an ice chest and packed with ice or other material necessary to keep the samples cool. The samples will be cooled and stored at or below 4 degrees Celsius until shipment to the analytical laboratory.

2.2.5 Special Handling Considerations

Samples to be analyzed for volatile constituents will be collected and capped with minimal no headspace. Samples will be transported to the laboratory promptly to provide ample time for analyses to be conducted within the applicable holding times. The field technician(s) will coordinate with the laboratory for sample pickup by the laboratory or a shipment by a courier. Prior to shipment, all samples will be carefully placed in an ice chest and packed with ice or other material necessary to keep the samples cool.

2.2.6 Sample Labels

Each sample container will have a sample label affixed to the outside of the container in an obvious location. The label will specify: sample identification number, name of collector (or

initials), location sampled, date and time sampled, preservation used, and parameters to be analyzed. All information will be recorded on the sample label with water-resistant ink.

Samples shipped from the facility to the laboratory by a commercial courier will be transported in a refrigerated shipping container sealed with tamper resistant tape or a tamper evidence seal. Each seal will have a unique number. In the event samples are received with broken seals, or the chain-of-custody seal is broken, another sample will be collected.

2.2.7 Field Logs

The field technician will complete a field log form for each sample location noting the following information:

- Sample location;
- Sample identification number;
- Sample source;
- Sample type and collection equipment;
- Personnel present at time of sampling, if applicable;
- Weather conditions at time of sampling, if applicable;
- Field filter techniques, if applicable;
- Sample appearance: color, turbidity, odor, sediments, etc., if applicable;
- Field analyses: temperature, pH, specific conductance, if applicable;
- Parameters (analytes from each sample aliquot);
- Comments and observations at time of sample withdrawal; and
- Signature and date of Field Technician upon field log completion.

All field log entries will be made in indelible ink. If an error is made in the field log, corrections will be made by crossing a single line through the error, initialing, and entering the correct information. The erroneous information should remain legible.

2.2.8 Chain-of-Custody Control

Each sample set for a sample location may consist of several individually labeled containers. Each sample container will be logged onto the chain-of-custody form prior to placement in a refrigerated shipping container or in a water monitoring laboratory refrigerator.

The following information will be recorded on the chain-of-custody form:

- Sample source (i.e. leachate);
- Collector's name;
- Dates of sample collection;
- Sample identification numbers;
- Sample location;
- Number of containers for each sample;

- Container size, type and preservatives used in each sample;
- Constituents or parameters (analytes for each sample);
- Rush analyses requested, if applicable;
- Special handling information, if applicable;
- Destination of samples;
- Name, date, time and signatures, of each individual possessing the samples; and
- Shipping container seal number (used only if transported by commercial courier).

The chain-of-custody form will be signed by each individual responsible for handling the sample containers and will accompany the samples until they are received by the outside laboratory.

Custody of the samples will be defined as actual physical possession, in view after physical possession, or locked and/or sealed in a tamper resistant container after physical possession. Signed chain-of-custody forms will be included in laboratory analytical reports, which will be maintained in site records.

2.2.9 Analytical Methods

Sample analyses will be performed using only EPA-recognized laboratory methods; these methods are listed on **Table 4**.

2.2.10 QA/QC Program

The quality and integrity of samples collected in accordance with this Post-Closure Plan will be monitored by routine preparation of various quality assurance/quality control (QA/QC) blanks, equipment calibration documents, and equipment decontamination. The collection of field QA/QC samples is in general accordance with procedures in the latest version of Ohio EPA's Technical Guidance Manual for Ground Water Investigations (TGM).

2.2.10.1 Trip Blanks

A trip blank will be analyzed during the annual leachate sampling events. Trip blanks consist of deionized water placed in appropriate sample containers by the analytical laboratory and included in the shipping container with the other (empty) sample containers prior to shipment. The trip blank sample accompanies site leachate samples sent back to the laboratory and is analyzed for VOCs. Trip blanks assess the potential influences of transport-induced contamination of the samples and can also be used to assess potential laboratory contamination.

2.2.10.2 Field Blanks

In general, field blanks will not be collected for annual leachate sampling events. If anomalous results occur, a verification resampling event for leachate may be conducted. Field blanks will be collected during leachate verification resampling events for the parameters showing anomalous results. Field blanks consist of deionized water poured into sample containers at the site during the sampling event and under the same environmental conditions as the leachate samples.

2.2.10.3 Field Duplicates

Field duplicate samples are an extra set of samples collected from a certain monitoring point. This set of samples is independent of the primary sample set but collected as close as possible to the primary set in both location and time. Field duplicates provide an indication of the variability in analytical results associated with sampling and laboratory procedures. Field duplicates will not be routinely collected during annual leachate sampling events. When collected, field duplicates will be labeled in such a manner so that persons performing laboratory analyses are not able to distinguish duplicates from other collected samples. Blind duplicates eliminate the possibility of laboratory bias reporting analytical results.

2.2.10.4 Matrix Spike/Matrix Spike Duplicates

One matrix spike sample and one matrix spike duplicate sample will be analyzed with the site samples during each routine sampling event or each 14-day calendar period if a sampling event spans more than 14 days. Matrix spikes are added to the sample, at the laboratory, prior to sample preparation and analysis. The matrix spike is used to determine the bias of a method in a given sample matrix. Matrix spike duplicates are intra-laboratory split samples spiked with identical concentrations of target analyte(s). Matrix spikes and matrix spike duplicates are used to document the precision and bias of a method in a given sample matrix. Matrix spike and matrix spike duplicate samples for annual leachate monitoring may be collected specifically from the Aber Road Facility or may be batch samples chosen at the laboratory.

2.2.11 Land Disposal Restriction Requirements

CECOS generates wastes that are subject to the land disposal restrictions. Examples of CECOS-generated wastes include F039 leachate and other wastes ancillary to normal process activities.

The applicability of the land disposal restrictions will be determined at the point of generation. This determination will be based on testing the waste using the test method described in the Appendix to OAC Rule 3745-51 or any other applicable method used to evaluate the constituent of concern. Alternatively the facility may use knowledge of the waste to identify restrictions pursuant to OAC Rule 3745-270-7(A) [40 CFR 268.7(a)].

As a generator, the facility may use knowledge of the process generating the waste to determine if the waste is restricted. In cases where knowledge is not adequate to determine the land disposal restrictions applicable to the waste, testing will be performed to determine the required information prior to shipment to a treatment, storage, disposal, or recycling facility.

Based on the specific prohibitions applicable to the waste, CECOS will complete the proper documentation required under OAC Rule 3745-270-7 (40 CFR 268.7)) as outlined below:

- If CECOS determines that the facility is generating a restricted waste that does not meet the applicable treatment standards set forth in OAC Rules 3745-270-40 through 3745-270-44 (Subpart D of 40 CFR 268), CECOS is to notify the treatment facility or storage facility in writing of the appropriate treatment standards set forth in

- the regulations. This notice must accompany each shipment and must include the information specified in OAC Rule 3745-270-7(A)(1) [40 CFR 268.7(a)(1)];
- If CECOS determines that the facility is generating a restricted waste under OAC Rule 3745-270 (40 CFR 148 or 268), and further determines that the waste can be land disposed without further treatment, CECOS must submit a written notice and certification with each shipment to the treatment, storage, or land disposal facility, that states the waste meets the applicable treatment standards set forth in OAC Rules 3745-270-40 through 3745-270-44. This notice must accompany each shipment and must include the information specified in OAC Rule 3745-270-7(A)(2) [40 CFR 268.7(a)(2)]; and
 - If CECOS generates a waste subject to a case-by-case extension under OAC Rule 3745-270-5 (40 CFR 268.5), an exemption under OAC Rule 3745-270-6 (40 CFR 268.6), or a national variance; CECOS must submit a written notice to the facility receiving the waste stating that the waste is not prohibited from land disposal in a surface impoundment or landfill which is in compliance with the requirements of OAC Rule 3745-270-5(H)(2) [40 CFR 268.5(h)(2)]. The notice must accompany every shipment and must include the information specified in OAC Rule 3745-270-7(A)(3) [40 CFR 268.7(a)(3)].

Records will be retained in the following manner:

- If CECOS determines that the regulated status of its waste, with respect to the land disposal restrictions, solely on knowledge of the waste, CECOS must retain all supporting data used to make this determination in files on-site;
- If the determination of whether the waste is restricted is based on testing of the waste or an extract of the waste developed using the test method described in Appendix I of 40 CFR 268, all waste analysis data must be retained in files on-site; and
- Copies of notifications, certifications, demonstrations, waste analysis data and other documentation produced is to be retained in files at the site for a period of five years from the date that the waste was last sent to on-site or off-site treatment, storage, or disposal. The retention is automatically extended during the course of any unresolved enforcement action regarding the regulated activity or as requested by the Director.

2.3 Leachate Removal

CECOS has installed several improvements to the site leachate removal and handling program as described herein. The first improvement involves the design and construction of leachate accumulation point tanks and automatic leachate standpipe pumps at various locations around the facility. The goal of establishing these accumulation points is to be able to remove leachate from all closed cell standpipes on an automatic basis, thereby reducing the leachate levels to the lowest practical limit achievable. Where possible, the collection tanks were located to segregate TSCA leachate from other leachates, but location and engineering design were the primary determining factors for the leachate accumulation point standpipe-to-tank piping. The leachate accumulation tanks and automatic standpipe pumps have been installed and are described in this Post-Closure Plan.

The second improvement involves the design and installation of a leachate pre-treatment system capable of removing or separating PCB oil phases, trace dioxins, and solids from the leachate to make the leachate more amenable to off-site treatment/disposal. The leachate treatment system has been installed and is described in this Post-Closure Plan.

2.3.1 Leachate Collection/Removal Procedures

An automatic leachate pumping system is in operation for SCMFs 3, 4/5, 6, 7, 8, 9, and 10. Leachate is pumped automatically from each leachate collection system standpipe installed within each SCMF to the leachate accumulation tanks. Each standpipe contains a 1.5 horsepower (hp), 1.5 inch discharge submersible pump (Hydromatic Model SKH-150 or equivalent), a 1.5 inch diameter leachate transfer line, a heavy duty galvanized chain to support the pump, and the electric cords supplying power to the pump and level controls. A liquid level controller with a two float system is employed to maintain the required leachate head level on the primary liner. The floats are differentially set to activate and deactivate the pump. The upper float is set at 0.8 feet above the surrounding top of the liner elevation to activate the leachate transfer system before the leachate level reaches 1 foot above the cell's primary liner system. The second float deactivates the pump and transfer system at 0.5 feet above the bottom intake of the pump thus protecting the 1.5 hp submersible pump from damage as a result of an insufficient volume of liquid collected within the bottom of the leachate collection system standpipe. Note the procedures for pumping the leachate may change over time as technology improves. For example, some pumps have been changed to have an amp meter installed that detects the lack of flow to shut the pump off.

Bottom elevations for SCMF subcells, leachate standpipes, and standpipe leachate pumps are provided in **Table 5**. The leachate discharge lines (1.5 inch HDPE pipe, 110 psi rated) are designed to meet the requirements of ANSI B31.3 and lay above the completed cap. One end of the leachate discharge line is connected directly to the 1.5 hp submersible pump and the other end leads into one of the leachate accumulation tanks located within reinforced concrete containment structures. Each leachate discharge line is contained within a 3-inch HPDE pipe for secondary containment. The pipe is heat fused in sections in a manner to form a water tight seal providing continuous secondary containment. The secondary containment is initiated within the leachate standpipe (the point where the line exits the standpipe) and is continued to the accumulation tank.

Leachate transfer lines are supported in cable trays above the cap. The cable trays are sloped toward the tank to allow free drainage of liquids to minimize freezing of the lines. Should temperatures fall to the point where freezing of liquids in the accumulation tanks interferes with proper operation of the system, the tanks will be temporarily taken out of service and leachate will be transferred from the standpipes using vac-trucks to the leachate treatment system.

As stated above, the leachate transfer and containment lines are supported in cable trays above the cap that slope continuously downward toward the leachate accumulation tank. This allows for free drainage of liquids in either the primary or secondary containment lines to flow to the tank and/or the leak detection capture point. The primary transfer line is a continuous run of 1.5-inch HDPE pipe (specifically Driscopipe 8600 series, SDR 13.1 or equivalent) with no joints, fittings, or valves located outside of the leachate standpipe or tank secondary containment. Bends in this section of the pipe are accomplished by cold bending the pipe within the allowable bend radius specified by the manufacturer. The

leachate accumulation tanks are all 7,500 gallons (except T112 which is 10,000 gallons). They are saddle supported horizontal tanks constructed of fiberglass reinforced resin as specified in ASTM Standard D 3299. Each tank system is designed, constructed, and operated in accordance with the requirements of OAC Rules 3745-55-90 through 99 and 40 CFR 264 Subpart J, as applicable.

Each tank system is protected from overflow by a high level alarm/shutdown system. A high level shutdown float switch is set to shut off power to the standpipe pumps prior to the tank overflowing with leachate. This high level shutdown system will be tested each day the tank is in service to ensure that the system is functioning properly. In addition, a float control is installed in the tank that will give a visible alarm (warning light) that is activated when the level in the tank exceeds approximately 1,000 gallons of remaining capacity in the tank. This level will be verified by daily inspection of the level in the tank. Tank leachate levels will be recorded daily and maintained in the site operating record.

The leachate transfer from the accumulation tank to the vac-truck will occur within the confines of the tank and loading containment area during loading. Since the discharge end of the transfer line will attach directly into the vac-truck, special couplings or check valves are not required. A manually operated gate or ball valve will be installed at the end of the discharge line to prevent leakage after the line is removed from the vac-truck. The high level warning for the transfer will be provided through visual inspection of the transfer operation. Any liquid remaining in the line at the end of the transfer will be removed by CECOS vacuum truck before the line is returned to its storage location within the tank secondary containment area.

2.4 Leachate Treatment System

CECOS has designed an elementary wastewater treatment system that will be used to pre-treat leachate prior to off-site treatment/disposal. The leachate treatment system was designed to meet three primary criteria. First, the leachate treatment system effectively separates the PCB containing phases of leachate from the aqueous phase. This allows the facility to pump all standpipes and effectively reduce leachate head levels. Second, the leachate treatment system reduces the total suspended solids (TSS) in the leachate. The high level of TSS in the site leachate has caused difficulties in meeting waste acceptance criteria at off-site treatment/disposal facilities. Third, the leachate treatment system is designed so that it could be modified in the future by the addition of new treatment modules as necessary.

2.4.1 Leachate Treatment System

As detailed in Section 2.3, leachate from the closed SCMFs is collected in the leachate accumulation tanks installed in the vicinity of the SCMFs. This collected leachate is periodically removed from the tanks by vac-truck and brought to the leachate treatment system, or if circumstances change could be shipped directly off-site for treatment/disposal. The leachate transfer from the accumulation tank to the vac-truck occurs within the confines of the tank storage and loading areas which are equipped with secondary containment. See Section 2.3 for additional details on leachate transfer. If the leachate was sent off-site for disposal without pretreatment at the leachate treatment system, a tanker truck would be used.

Figure 3 provides a process flow diagram of the leachate treatment system. The leachate is first pumped from the vac-truck to Tank T-1, which is operated on a batch basis. The leachate remains in Tank T-1 for 24 hours to separate oils and solids from the leachate. Solids and oils settling at the bottom of Tank T-1 are pumped into 55-gallon drums for offsite disposal. The remaining liquid is then treated. The leachate treatment system then becomes a flow-through treatment system designed to handle 4,320 to 9,600 gallons per day (8 hour shift).

Leachate from Tank T-1 flows by gravity into Tank T-2. From Tank T-2 the leachate is then pumped into the first reactor in the treatment unit M-1. In the first reactor, the pH of the leachate is lowered to between 4 and 5 using sulfuric acid. Ferric chloride can also be added to the leachate to promote the formation of solids. The leachate is then mixed with an electric agitator. This process is the initial step in producing the flocculent.

The leachate then flows to the second reactor in M-1. In this reactor, lime slurry is added to the leachate to increase the pH of the leachate to 8.5. The leachate is mixed with an electric agitator and solids begin to form.

The leachate then flows into the third reactor for flocculation. An anionic polymer is added to the reactor which neutralizes the surface charge on the solids and causes them to agglomerate to a size that will settle by gravity.

The leachate and solids then flow into a lamella clarifier within the treatment unit for solids removal. Solids are removed from the leachate and pumped to Tank T-5. The clear leachate flows by gravity to Tank T-3 and is then pumped to Tanks T-102 or T-103, for temporary storage prior to off-site shipment. **Table 6** presents a summary of the individual units within the leachate treatment system. The filter press, F-1, removes water from the sludge which is collected in Tank T-5. Dewatered solids are containerized for off-site treatment or disposal and liquid is pumped back to Tank T-2 for further treatment.

Due to the various regulatory constraints from TSCA and RCRA programs, CECOS has found it difficult to establish and maintain treatment/disposal outlets. The intent of the installation of the leachate treatment system was to increase the flexibility of the CECOS leachate management program to meet off-site facility waste acceptance standards, not to constrain leachate management practices.

Various occurrences can effectively change the current leachate management program:

- Leachate can change its characteristics over time;
- Regulations can be amended or new ones promulgated (i.e., the creation of the F039 hazardous waste code and associated LDR standards);
- Availability of treatment/disposal outlets; and
- Developments of new and improved technologies.

Overall, however, leachate management practices will remain consistent with this Post-Closure Plan. Standpipe-to-tank piping arrangements may change based upon changing PCB levels and/or pumping volumes. Use of either a portion of the treatment process or the whole leachate treatment system may not be necessary to meet applicable TSCA and RCRA regulatory standards and/or an off-site facility waste acceptance requirements.

Since the manner of operation of these systems will not change, revisions to the leachate management program will not necessitate a revision to the Post-Closure Plan. Any additions of treatment modules to the leachate treatment system would however, require a revision to the Post-Closure Plan. Revisions to the Post-Closure Plan will be completed as stated in Section 1.7.

2.5 Disposal of Leachate Contaminated Sludge, Residue, Equipment, and Debris

During the course of leachate handling, treatment, and storage, various activities may produce sludge (filter cake), residues, equipment, or debris that have come into contact or potentially have come into contact with leachate and require disposal. Contaminated residue material could include:

- Sludge (filter cake) and waste oil from leachate pretreatment operation;
- Tank clean-outs (contaminated water storage facility, leachate accumulation tanks, and leachate treatment tanks);
- Wastewater tanker clean-outs;
- Vacuum truck clean-outs;
- Sump clean-outs (container transfer dock, contaminated water storage facility and leachate accumulation tank secondary containment structures, and truck wash facility);
- Spent carbon from SCMF vent canister and vent-sorb drums; and
- Other designated one time sources.

Contaminated debris could include:

- Personal protective equipment (e.g., respirator cartridges, Tyvek suites, gloves, etc.);
- Non-reusable sampling equipment; and
- Leachate transfer hose couplings, pumps, etc.

The generation and collection of sludge (filter cake) from the leachate pretreatment system was discussed in Section 2.4.1.

Tanks are cleaned out when the level of solids operationally interferes with the use of the tank.

Contaminated residue and debris will be collected and stored in 55 gallon drums, marked as F039 solids, and stored in an approved storage area. The container will be closed when not in use, and inspected weekly. Waste F039 solids and debris will then be shipped off-site for proper treatment/disposal at an approved TSD facility. Proper characterization, waste coding, and applicable land disposal requirements will be followed as presented in Section 2.2.

Non-discarded heavy equipment, tankers, portable pumps, hand tools, reusable sampling equipment, etc. that have been contaminated by contact with F039 solids or leachate will be decontaminated at the Truck Wash Facility.

2.6 TSCA Leachate Issues

In addition to the annual characterization sampling described in Section 2.1, batch sampling of the treatment system effluent will be performed to ensure compliance with TSCA leachate treatment/disposal requirements. A batch composite sample of the leachate treatment system effluent analyzed for total PCBs will yield the necessary leachate characterization and leachate treatment system performance information. Sampling procedures will follow those established in Section 2.2. Analytical results will be maintained as part of the site operating record. Should, however, the facility determine through analysis that leachate PCB levels have decreased over time, use of the leachate treatment system may become unnecessary to meet TSCA regulatory treatment/disposal levels.

3.0 INSPECTION PLAN

The purpose of the post-closure inspection program is to detect damage, deterioration, malfunctions of SCMF units (including units closed as SCMFs), ancillary equipment, and facility structures during the post-closure care period. Throughout this Plan, references to the "Site Manager" also include his/her designee.

This inspection plan is applicable to the following categories of closed regulated waste management units:

- SCMFs (and units closed as SCMFs) that have undergone partial closure before closure of the facility; and
- Regulated waste management units that underwent closure (during partial or final closure) as a landfill unit in accordance with OAC Rule 3745-57-10 and 40 CFR 264.310.

In addition, CECOS is operating the leachate treatment and storage facilities and other support services during the post-closure care period. Daily, weekly, and monthly inspection procedures for these facilities are also included in the inspection plan.

To meet and exceed requirements listed in OAC Rules 3745-54-15 and 3745-54-73(B)(5), CECOS will maintain this inspection plan and a record of the inspections (checklists, remedial action forms, etc.) at the Aber Road Facility for the duration of the post-closure care period.

3.1 Conducting the Inspection

Inspections will be performed at the required frequency (i.e., daily, weekly, monthly, and quarterly) by on-site personnel or contractors familiar with the CECOS Facility and the site inspection plan. Personnel performing the inspections will conform to the personnel training requirements of OAC Rule 3745-54-16 (40CFR 264.16). A checklist that corresponds directly with the requirements outlined in this section will be completed by the inspector for each inspection and will serve as documentation of the inspection and the basis for the initiation of any necessary corrective actions. CECOS reserves the right to change the checklist format and content, as long as the requirements outlined in this Inspection Plan are met.

3.2 Corrective Action

When a problem is discovered, the inspector's response will be dictated by the item's potential to adversely affect human health and the environment as follows:

- The inspector will immediately notify the Site Manager for any situation or condition that may pose an immediate threat to human health or the environment, or is critical to safe site operations. A management decision will be made immediately to determine the appropriate corrective action to be taken. This action will be taken immediately. If the time that will elapse between discovery of the problem and initiation of the corrective action or between initiation and completion of the corrective action could compound the situation, the inspector will tag or lock out equipment and/or shut down operations as necessary until the corrective action is

completed and the hazard eliminated. If a hazard is imminent or has already occurred, and represents a threat to human health or the environment, corrective action will be initiated immediately;

- When the inspector discovers any problem that does not pose an immediate threat to human health, safety, or the environment, but could potentially evolve into an environmental or human hazard a Remedial Action Form (RAF) will be prepared and issued. Corrective action should be finalized within five operational days, unless an extension is approved;
- When the inspector discovers any situation or condition necessary for proper site operations, but which does not interfere with day-to-day operations, nor poses an environmental or human health hazard, an RAF will be prepared and issued. The problem should be corrected within 10 operational days, unless an extension is approved; and
- Problems posing no environmental or human health hazard, but that are still important to efficient site operations or site appearance will be corrected within 30 operating days, unless an extension is approved.

If the problem is corrected before the end of the inspection period, it will be confirmed by the inspector. It will be noted in the "comments" section that the problem has been corrected, and the inspector will not initiate the RAF process. If a problem still exists at the end of the inspection, an RAF is prepared.

3.2.1 RAF Processing

The post-closure Inspection Plan provides for the use of an RAF to identify compliance problems and document the corrective action. This form, or equivalent, will be used to record each deviation or problem observed by the inspector that requires remedial action and was not corrected before the inspection was completed. See **Figure 4** for an example of an RAF form. The inspector will note the deficient item and describe the problem. In addition to implementing the RAF process, a check will be placed in "RAF Prepared-Yes" column on the inspection check sheet. If, however, the problem was corrected before the end of the inspection period, and a RAF was not prepared, a check will be placed in a "RAF Prepared-No" column. The initiated RAFs and check sheets are routed to the Site Manager. The Site Manager is responsible for ensuring that the required corrective actions are initiated and completed within the proper time frames. Please note that during the post-closure period, CECOS expects that certain job titles at the facility may change or will be eliminated. Therefore, the routing signature chain on the RAF form may not be possible. However, CECOS will continue to document the finding, remedial action, and the inspector's and responsible assigned responder's signatures.

Once a problem is discovered, the inspector denotes the check sheet item, describes the problem, calculates the corrective action due date, and signs and dates the RAF. He assigns it a RAF log number. See **Figure 5** for an example of an RAF log page. The inspector then routes the RAF to the Site Manager. The Site Manager reviews the inspector's comments, assigns the corrective action to be implemented, estimates the completion date, adds any comments, signs, and dates the form. The Site Manager is responsible for ensuring that the corrective action is completed within the specified completion date and will authorize any time extension requests. The inspector maintains a copy of the RAF for verification of corrective

action completion. The Site Manager is responsible for ensuring that any past due corrective action is completed as soon as possible.

The inspector maintains all RAFs until corrective action is completed. He continues to inspect the outstanding items on the RAFs. As necessary, he will compile a list of all past due RAFs and forward this to the Site Manager.

3.3 Inspection Procedures and Frequency

The Inspection Plan procedures for the facility are based upon daily, weekly, monthly, and quarterly inspections. The frequency of inspections is based on regulatory requirements and the known or anticipated potential for these structures or facilities to need scheduled or preventative maintenance or observation. Furthermore, the frequency selected to inspect the facility is also based on the anticipated or perceived risk inspections. Hence, the components with the highest degree of risk to the environment have been selected to receive the most frequent inspection, and need a higher degree of post-closure effort than those items scheduled for monthly or quarterly inspections. Accordingly, since most components of the completed cap do not present an immediate threat to the environment, and since these components such as integrity of the final cover, run-on and run-off control devices, and cover vegetation tend to develop problems over longer periods of time, a monthly inspection schedule was selected. Finally, those components that do not affect the integrity of the completed cap should they fail or become damaged, such as groundwater monitoring wells and benchmarks, have been selected for quarterly or semiannual inspections.

Throughout the post-closure period other inspections will be performed at the site on a daily, weekly, and monthly basis. These inspections cover the RCRA-mandated tank and container storage inspections, general site inspections, and site safety equipment inspections.

3.3.1 Daily Inspections

The following areas will be inspected daily. These inspections include general visual observation of facility equipment and operations. Specific measurements or comments will be recorded, where necessary. Before conducting the inspection, the inspector must review, at a minimum, the previous inspection checklist and the outstanding RAFs to ensure continuity and identify completion of remedial actions. The example daily inspection checklist is shown on **Figure 6**.

Truck Wash Facility

When the truck wash is in use the following will be inspected daily. When the truck wash is not being used to clean equipment the inspection sheet will be noted as not applicable (N/A).

- When in use, the drain trenches will be inspected for the presence of liquids and potential over-fill conditions. If liquids are present at a level higher than the required 2-foot freeboard, the Site Manager will be notified and liquids will be removed. Solids in the drain trenches will be estimated and recorded. When the drain trenches require cleanout, the Site Manager will be contacted. The Site Manager

will also be responsible for directing the removal of solids and proper cleanup and containment until the appropriate disposal methods can be arranged;

- When in use, the area surrounding the drain trench and the general area will be visually inspected for obvious signs of spills or leakage and presence of solids. If spills of material or leakage are observed, the material will be cleaned up and the material placed in the appropriate tank or drum until the proper method of disposal can be arranged. If the solids require cleanup, the Site Manager will be contacted and he will be responsible for removal of the solids;
- When in use, overfilling control equipment at the truck wash facility will be manually checked. If the alarm is malfunctioning, the Site Manager will be contacted and he will be responsible for authorizing the necessary repairs; and
- When in use, secondary Containment System will be inspected for the presence of liquids (alarm sounding). The alarm will be tested by use of test switch. If water is present or the alarm is non-operational, the Site Manager will be contacted. The Site Manager will be responsible for remediation of the problems.

Leachate Accumulation Tanks, Leachate Treatment Tanks, and Contaminated Water Storage Tanks

The Leachate Accumulation Tanks (T-104, T-105, T-108, T-109, T-110, T-111, and T-112), Leachate Treatment Tanks (T-101, T-1, T-2, T-3, T-4, T-5, T-6, T-7, T-8, T-9, T-10, M-1, and F-1), and Contaminated Water Storage Tanks (T-102 and T-103) will be inspected daily utilizing the following criteria:

- The level of liquid in the tanks will be checked and record. The inspector will check the overfill alarms and liquid level logs to ensure completeness;
- The loading/unloading area and sump (if applicable) will be inspected for presence of spills, cracks, leaks and deterioration. If spillage of materials is present, the Site Manager will be contacted. The Site Manager will be responsible for cleaning up and containing the material. The spill will be contained and the material placed in a drum until the proper disposal method can be arranged. If cracks or deterioration are found, the operations department will be responsible for authorizing the necessary repairs;
- The inspector will visually inspect the exterior of the tanks and containment structure for evidence of corrosion and leaking. The inspector should observe all visible welds (especially at plate intervals and where flanges and portals join the plate) to ensure that there are no obvious signs of leakage. Corrosion resistant coatings will be noted for peeling, spalling, and other signs of general deterioration. The overall condition of the containment structure will be observed for cracks, holes, tears, or deterioration of seams and joints. If the tanks or containment structure are leaking, cracked, deteriorating, or corroded, the inspector will notify the Site Manager. The Site Manager will be responsible for coordinating cleanup of leaks from tanks (within 24 hours) and/or coordinating certification of major repairs through a qualified consultant;
- Overfill control for the leachate accumulation tanks will be inspected by manually lifting the float switch in each tank to ensure that the system is in proper working order. The Site Manager will be responsible for repairing or replacing parts;

- All pumps, hoses, valves, and other ancillary equipment (above-ground piping) will be inspected for evidence of deterioration, leaks, malfunctions, or corrosion. Signs of rust, structural damage, and leaking connections will be noted. The inspector will notify the Site Manager, who will be responsible for making repairs or replacing parts;
- The secondary containment area will be inspected for spills and/or accumulated precipitation. The leak detection capture points for the secondary containment of the leachate transfer piping will be inspected for the presence of liquid. If spillage of material or accumulated precipitation is present in the secondary containment area or leak detection ports, the Site Manager will be contacted. The Site Manager will direct proper containment and cleanup of the material which will be placed in the appropriate tank or drum until the proper disposal method can be arranged. Accumulated precipitation will be pumped from the containment area within 24 hours and properly disposed; and
- The leachate accumulation tanks and contaminated water storage tanks will be checked to ensure that they have been marked with the start of accumulation date and are labeled "Hazardous Waste." The date will be checked against the maximum holding time period of 90 days. The Site Manager will be notified when the current date is within two weeks of the storage deadline.

Closed SCMFs and Units Closed as SCMFs

- Evidence of Leachate Seeps - Any liquid on the ground beneath or adjacent to secondary leachate containment lines, or adjacent to standpipes would indicate not only a failure in the containment line, but also in the primary transfer line. The system should be immediately shut down and the affected portion of the leachate collection system will be tested for the area of failure and reported immediately to the Site Manager for immediate repair;
- Leachate Collection/Detection Systems are Operable - All leachate collection/detection systems hoses above ground will be checked daily. The visual inspection will include all connections, the road crossings, mechanical or butt welds, secondary containment lines and primary lines which can be seen through the secondary containment line. Areas where leachate lines drape over metal or concrete will be specifically checked. During cold weather months particular attention will be given to areas where the collection lines sag, allowing fluid to become trapped within the line; and
- Leachate standpipes - All standpipes will be visually checked for their integrity. The pumps in the standpipes will be checked to ensure they are operating correctly.

3.3.2 Weekly Inspections

The following areas will be inspected each week. These inspections include general visual observation of facility equipment and operations. Specific measurements or comments will be recorded, where necessary. Before conducting the inspections, the inspector must review, at a minimum, the previous inspection checklist and the outstanding RAFs to ensure continuity and identify completion of remedial actions. The example weekly inspection checklist is shown on **Figure 7**.

General Facility

- Emergency exits will be checked for obstructions. If emergency exits are blocked, the blockage will be removed immediately;
- The spill control dam in the drainage swale west of the office buildings near the site entrance and the dam on the drainage swale north of the small sanitary landfill will be inspected for condition and presence of debris that could render them non-functional. If any problems are found the Site Manager will be notified and will be responsible for correcting the problem;
- Site communications equipment will be checked for proper operation. If any problem is discovered, the Site Manager will be notified and will be responsible for any corrective actions;
- Eyewash facilities at the contaminated water storage facility will be inspected for operation. If any are non-functional the Site Manager will be notified;
- The water level in the water tower will be checked to ensure the volume is adequate to provide water for site emergencies (40,000 to 50,000 gallons). If a problem is noted, the Site Manager will be notified and is responsible for any corrective actions; and
- Spill prevention and containment equipment will be inspected for supply and operating condition. The inventory of supplies will be checked against the lists found in the Site Contingency Plan. The Site Manager will be responsible for assuring the inventory is maintained and that deterioration or non-functioning equipment is repaired or replaced.

Container Transfer Dock/Leachate Treatment System Storage Area

The container transfer dock will be utilized as a less-than-90 day storage area. Drums can also be stored in the leachate treatment system area. Whenever drums are stored, the following inspections will occur. If an area is not actively being used to store hazardous waste, the inspection is not necessary.

- The posting of warning signs in appropriate locations will be inspected. If such signs are not present, the Site Manager will be contacted immediately. The Site Manager will provide new signs to replace the missing or damaged signs;
- Containers storing hazardous waste cannot be stored for greater than 90 days. When a container has been stored for a period of time approaching 90 days, the Site Manager will be notified;
- Containers holding hazardous waste or chemical supplies in the drum transfer dock will be inspected to ensure that they are in good condition. If the containers are leaking or otherwise damaged, the operations department will be notified and they will be responsible for replacing them. The Site Manager will be advised and direct the clean-up of spilled materials. The material will be placed in the appropriate tank or drum until the proper method of disposal can be arranged; and
- The drums will be inspected for proper labeling. If drums are found to be improperly labeled, the Site Manager will be contacted and will take the necessary action to clearly identify and label the drums.

3.3.3 Monthly Inspections

The following areas will be inspected each month. These inspections include general visual observation of facility equipment and operations. Specific measurements or comments will be recorded, where necessary. Before conducting the inspection, the inspector must review, at a minimum, the previous inspection checklist and the outstanding RAFs to ensure continuity and identify completion of remedial actions. The example monthly/quarterly inspection checklist is shown on **Figure 8**.

General Facility

- The fencing and entrance gates will be inspected for general condition and evidence of unauthorized entry. If the fencing or entrance gates need repair, the Site Manager will be contacted and will be responsible for coordinating remedial actions. If there are signs of unauthorized entry, the Site Manager will be notified and immediately take action to assure access barriers are repaired and/or security increased;
- The warning signs placed around the facility perimeter will be inspected for general condition and appropriate placement. If the signs need replacement or repair, the Site Manager will be contacted. The Site Manager will be responsible for coordinating remedial actions;
- The roadways will be inspected for freedom from obstruction and general condition. If an obstruction is blocking the road, or if the road displays evidence of deterioration, the Site Manager will be contacted. The Site Manager will be responsible for coordinating remedial actions;
- Drainage ditches will be inspected for obstructions, erosion, debris, and ponded liquids. If the drainage ditches contain ponded liquid, wind-blown debris, or other obstructions, the inspector will notify the operations department, who will be responsible for coordinating remedial actions and restoring free-flow conditions. If erosion is noted, the Site Manager will arrange for replacement and compaction of the eroded area with topsoil;
- First aid and protective equipment storage supplies will be inspected and inventoried. If first aid supplies and equipment need replenishing, the Site Manager will be contacted and the Site Manager will obtain the needed supplies;
- Fire extinguishers in all buildings, support structures, and operating equipment will be checked for condition and charge. If any problems are found the Site Manager will be notified and will be responsible for any actions necessary. Equipment will be onsite as required in the Contingency Plan;
- The spill control weirs on the south side of the Sanitary Landfill will be inspected for evidence of debris or other materials that could render them non-functional. If debris is present, the inspector will notify the Site Manager;
- Area lighting at entrances and emergency lighting systems will be inspected for adequacy and operational condition. If area lighting is found to be non-operational or inadequate, the Site Manager will be contacted and he will authorize corrective action immediately; and
- Smoke detectors in the appropriate buildings will be checked for proper operation and repaired or replaced as necessary.

Leachate Collection System

- PVC piping encasing the electrical conduits that runs to the standpipes will be inspected for evidence of deterioration. If deterioration is detected, the inspector will notify the Site Manager. The Site Manager will be responsible for coordinating the necessary repairs.

Closed SCMFs and Units Closed as SCMFs

- Erosion of Top or Sides of Cover - Check for barren areas void of vegetation and grooves or channels where surface run-off has removed the vegetation exposing the soil cover. During extended periods of dry weather or drought conditions the soil cover may crack due to loss of moisture below the vegetation. Erosion of the cover is most likely to occur during the early stages of vegetation growth, particularly during the wet part of the year. Once the roots have taken hold and the vegetation is established, the likelihood of erosion is substantially decreased. Areas where the slope changes gradient will be inspected for ponding or evidence of erosion. If erosion is detected it will be immediately reported to the Site Manager for repair;
- Differential Settlement or Subsidence of the Cover - Should the waste material contained within the cell settle over time; minor subsidence of the cover may occur. This may cause minor ponding of stormwater. Settlement will not occur rapidly. Therefore, monthly routine visual checks will be conducted to detect any changes in the original slope of the cover. Settlement can be measured by marking the standpipe at the surface of the cover annually. Settlement will be considered significant if in a vertical plane, 2 feet of settlement occurs in a 20 foot length. If a significant settlement is detected it will be immediately reported to the Site Manager for repair and the SCMF will be surveyed (see Section 3.3.4); and
- Poorly Vegetated Areas and Unwanted Vegetation - Poorly vegetated areas will be obvious during the visual inspection of the cover; however, a closer check may be able to reveal the reason. Extended periods of dry weather, long hot dry days, leachate seeps, animals attempting to burrow, or poorly rooted vegetation could be the problem. If it is a small area it should be reseeded at the first opportunity and watered to promote rapid growth. When an area is reseeded, the seed mixture recommended by the Clermont County Soil and Water Conservation District will be used. Once the area has recovered, the area will continue to be checked to ensure it continues to grow and also to check to see if adjacent areas begin to die. This could mean the grasses have become diseased or that the plants suffered winter kill. Lack of moisture may be the problem and should be considered.

The presence of unwanted vegetation (saplings, brush, etc.) will also be checked during this inspection. If unwanted vegetation is detected, it will be removed. If the topsoil is disturbed during removal, topsoil will be added and hand-compacted, and the area will be reseeded as discussed above.

- Standpipe Covers and Electrical Connections - All leachate standpipes (riser pipes) will be capped with a 4-inch x 4-inch piece of treated lumber covered with a 0.40-inch thick aluminum lid which is held in place by a stainless steel threaded rod and retaining nut. Leachate hoses and electrical lines will exit the concrete riser through

a hole cut in side of riser and sealed with latex caulk. An electrical control box will be mounted on the side of each riser pipe.

Inspections should verify that there is no wear damage to any electrical lines or leachate hoses, electrical control boxes are securely mounted, all connections are tight, and the electrical control box cover is in place. While inspecting the standpipe area a visual check should be made for settlement around the standpipe. The mark mentioned under differential settlement or subsidence of the cover will be used for reference.

- Drainage Ditches and Associated Structures - An essential part of the routine site maintenance is the inspection of all drainage ditches, culverts, channels, and underground storm sewer system. The design of the final caps is such that run-on cannot occur; however, all ditches and culverts in the surrounding area must be periodically checked for obstructions. Surface run-off from the cover must not be allowed to accumulate adjacent to the closed cell. Most ditches are vegetated to prevent silting, and all ditches are open and capable of handling surface run-off. Culverts need to be checked monthly for brush accumulations and silting; and
- Evidence of Animal Burrows - Although the entire permitted area of the CECOS, Aber Road Facility is fenced with chain link fence, burrowing animals such as woodchucks (ground hogs) can gain access to the closed cell cover. Inspection of the cover will reveal rodent holes (dens) which should be noted for immediate remedial action.

Moles have not been detected on any closed cell cover; however, the periodic visual inspection will detect evidence of mole burrows. Should this become a problem immediate action is required to prevent damage to the vegetative cover.

- Gas Venting System, Carbon Filters - Gas venting pipes are included in the final capping design for all SCMFs. These 2-inch PVC riser pipes will have canisters connected to the gooseneck which are filled with granulated activated carbon. These filters are checked monthly and replaced annually. The end cap of the filter canister contains a series of 3/8-inch diameter holes. These holes should be clear of dirt or dust and should be checked each month. For all SCMFs, as part of the monthly inspection, organic vapors escaping to the atmosphere through the vents shall be measured with a photoionization detector (P.I.D.) or comparable equipment. The probe for this instrument is placed inside the gas venting pipes to eliminate the possibility of wind dispersion of vapors. If vapors in excess of 2 parts per million (ppm) above ambient background conditions are detected, the carbon canister shall be considered spent and shall be replaced that month with a new canister.

Truck Wash Facility

The facilities foundation will be visually inspected for cracks or deterioration. If the foundation shows signs of deterioration, the operations department will complete repairs as necessary.

3.3.4 Quarterly Inspections

Closed SCMFs and Units Closed as SCMFs

The following items for closed SCMFs and units closed as SCMFs will be inspected quarterly in accordance with the corresponding criteria. The quarterly inspections are documented once per quarter on the appropriate monthly inspection form (See **Figure 8**).

- Cap Survey for Settlement - Should areas of significant settlement or subsidence be detected visually (see Section 3.3.3 for a definition of significant subsidence or settlement), survey methods will be employed to conduct a topographic survey of the affected area to determine the overall amount of subsidence; and
- Benchmarks are maintained. There are two permanent concrete facility benchmarks located in a wooded area in the northwest corner of the site (shown on **Figure 1**). The benchmarks are located as follows:

<u>Benchmark</u>	<u>Site Coordinates</u>	<u>Longitude/Latitude</u>
1	N5999.625/E4999.526	84°03'00"/39°07'46"
2	N5549.475/E4999.655	84°03'00"/39°07'42"

The benchmarks are clearly marked and protected from all but foot traffic. They will be inspected to ensure that they are still present and have been undisturbed. If root growth threatens any of the benchmarks, the offending shrub or tree will be removed.

Leak Detectors and Underdrains

The following items for the leak detectors and underdrains will be inspected quarterly and documented once per quarter on the appropriate inspection form (See **Figure 8**):

- Condition of surface pipe to ensure no cracks or breaks, no vegetative or animal intrusion;
- Condition of leak detector and underdrain pipe caps to ensure they are in place and secure; and
- Condition of pumps to ensure they are operational. As of the date of this Post-Closure Plan, only underdrains U-1, U-2, U-7, U-8 and U-9 are inoperable. These underdrains are located inside the slurry wall in the CMI area.

3.3.5 Semiannual Inspections

The only semiannual inspections involve the integrity of the groundwater wells that are part of the active program for water level and water quality monitoring. This inspection program will ensure that the monitoring wells and piezometers perform to design specifications throughout the life of the monitoring program. Inspections of groundwater monitoring wells will be completed during the semiannual monitoring by the inspector, site monitoring personnel, and/or qualified contractor hired to maintain the groundwater monitoring system. Each well will be visually inspected to assure that access is readily available and to identify needed repairs or maintenance. DMP wells will be inspected during sampling to verify that

the well is capable of producing representative groundwater samples. The inspector will evaluate the monitoring well according to the criteria set forth on the maintenance checklist (See **Figure 9**). Inspections will be documented on a Maintenance Evaluation form and notification of the need for repair will be made on the Corrective Action form, **Figures 9 and 10**, respectively. In addition, during routine groundwater monitoring, each well to be sampled for water quality will be inspected to assure properly functioning dedicated purging/sampling equipment exists, where applicable. The inspector will take any necessary supplies (i.e., new well caps, new locks, etc.) to perform minor maintenance necessary to retain well integrity. Major repairs will be completed after the inspections are finished and prior to the next semiannual sampling event.

At the minimum, groundwater monitoring wells will be inspected for the following:

- Concrete pad, barrier poles, and protective casing are in good shape;
- Protective casing and locking cap in-place and operable;
- Well casing and cap are in good shape;
- Evidence of physical damage;
 - Vertical alignment of protective casing;
 - Cracks in surface seal;
 - Freeze/thaw effects (lifting of casing);
 - Integrity of well seal cap; and
- Evidence of obstructions in the casing.

When the inspector determines that major repairs are necessary, he will notify the Site Manager who will ensure that the repairs are made prior to the next semiannual monitoring event. When the appropriate work is finished, the field inspector or Site Manager will verify by signing and dating the corrective action form (**Figure 10**) and initializing and dating the well maintenance evaluation checklist.

Well redevelopment is discussed in Section 4.2.1. Wells that may become obstructed or otherwise become unserviceable through time will be noted to Ohio EPA prior to the next semiannual DMP monitoring event. The need for well abandonment and/or the installation of replacement wells will be discussed with Ohio EPA before undertaking the work.

4.0 MAINTENANCE PLAN

This maintenance plan has been prepared in accordance with OAC Rule 3745-55-18(B)(2). The Site Manager will be responsible for initiating and authorizing remedial activities and unscheduled maintenance. It is expected that routine inspections set forth in Section 3 will identify items that require maintenance. Maintenance requirements for leachate treatment, removal, and collection systems will most likely be identified by leachate management personnel. The routine inspections detailed in Section 3 are conducted on a daily, weekly, monthly, quarterly, and semiannual basis and will be used as part of this maintenance plan to ensure that maintenance activities are completed in a timely fashion. Additionally, it should be noted that maintenance activities detailed in this section are conducted in conjunction with maintenance activities specified in the CMI O&M Manual (November 1998 or the current plan) which include standard operating procedures, equipment manufacturer specifications; Appendix E of the RCRA Facility Closure Plan (December 1993); and in the event of an emergency situation the facility Contingency and Spill Prevention, Control, and Countermeasure (SPCC) Plans.

Major remedial action or maintenance efforts are not anticipated, although they may be required. If major maintenance or remedial action is necessary, a qualified consultant will be employed to assess the situation. If an independent contractor is used the contractor must be qualified and will act under the certifying engineer's supervision. The time table for initiating corrective actions is discussed in Section 3.2, Corrective Action.

4.1 Final Cover Maintenance

The majority of post-closure care maintenance activities for the closed SCMFs will consist of maintaining the integrity of the cap structure for each unit.

4.1.1 Cover Erosion

Extreme weather events may cause erosion of the cover and ponding. Before starting repair, the area will be inspected to determine if other damage, such as cracking or slumping, has occurred.

Cracking or other damage to the cover will be repaired before the eroding area is repaired. Minor cover cracking will be repaired by excavating the surrounding area to an appropriate depth (no lower than the drainage layer) followed by placement of topsoil. Topsoil used to repair the vegetative component of the cap will be comprised of soils meeting Ohio Department of Transportation (ODOT) Specification 653.02. The surface will then be graded to allow proper drainage. If the synthetic cover membrane is damaged, the surrounding area will be excavated to expose the complete blemish. The synthetic membrane will be patched, using a method suggested by the manufacturer, and recovered with the drainage layer, three feet of topsoil material (ODOT 653.02), and a vegetative layer.

Once any other necessary repairs have been performed, the eroded areas will be addressed. Topsoil (ODOT 653.02) will be placed on the eroded area. The slope of the newly compacted soil will be groomed to allow conformance with the surrounding area and to provide adequate run-off. The soil will be either manually graded or graded by light-duty construction equipment. The area will be revegetated using the seed mixture

recommended by the Clermont County Soil and Water Conservation District. The area will be inspected monthly to determine if further slumping has occurred.

Soil replacement will be performed using standard equipment and labor. It is anticipated that for the routine soil replacement activities, topsoil will be borrowed from natural on-site deposits and/or purchased from off-site sources.

4.1.2 Cover Subsidence/Settlement

In addition to possible erosion damage of the final cover, subsidence and/or differential settling within the cell may lead to some minor ponding of stormwater on the cover as well as minor cracking of the cover. Remedial activity for areas in which ponding occurs will consist of application of topsoil, followed by grading to provide proper drainage, and application of a final topsoil layer and revegetation.

To determine if a major repair is required, a significant subsidence is defined as a differential settlement measured on the cap of 2 feet or more subsidence over a span of 20 feet. A major repair will consist of removal of the vegetative soil cover and an inspection of the synthetic membrane liner and compacted soil liner. If the integrity of these is found to be compromised, it will be repaired and restored to its original condition. Any repairs to the geomembrane cover will be certified by an independent professional engineer that the repairs were made in accordance with standard industry practices.

4.1.3 Vegetative Cover

To prevent the establishment of deep-rooted species which may jeopardize the integrity of the final cover, all final cover vegetation will be mowed, as needed, throughout the post-closure period. Periodic reseeding and mulching will be conducted as necessary to maintain uniform vegetation. It is anticipated that mowing will be needed approximately two to three times per year.

CECOS will obtain an analysis of the cover topsoil prior to initial application of lime and fertilizer (at time of seeding), and then every three years thereafter. CECOS will obtain the analyses and recommendations for lime and fertilizer applications and shall apply the recommended amounts of lime and fertilizer as determined by the Clermont County Soil and Water Conservation District.

4.1.4 Run-On/Run-Off Control System

An essential part of the routine site maintenance is the inspection of all drainage ditches, culverts, channels, and underground storm sewer system. The design of the final caps is such that run-on cannot occur; however, all ditches and culverts in the surrounding area are checked for obstructions per the Inspection Plan. Drainage ditches may require periodic maintenance and repairs due to erosion damage. Erosion requiring repair is defined as a situation that leads to siltation. Maintenance of eroded portions of the drainage ditches will consist of replacement and compaction of the eroded area with topsoil or other stabilizing material. Depending on the size of the eroded area, the soil will be either manually compacted and graded, or compacted and graded by heavy equipment.

Additional maintenance may periodically be required to remove accumulations of sediment and debris which are carried into the ditches by run-off. Sediment or debris will be removed manually or with heavy equipment.

4.1.5 Animal Control

Through regularly scheduled site inspections, burrowing animals may be detected on the facility premises. Although the entire permitted area of the Aber Road Facility is fenced with chain link fence, burrowing animals such as woodchucks (ground hogs) can gain access to the closed cell cover. Inspection of the cover will reveal rodent holes (dens) which should be noted for immediate remedial action. Moles have not been detected on any closed cell cover; however, the periodic visual inspection will detect evidence of mole burrows. Should this become a problem immediate action is required to prevent damage to the vegetative cover. Any damage to facility structures such as drainage channels or final grading patterns will be repaired using topsoil (ODOT 653.02), or select off-site material, as appropriate. In the event a persistent problem develops, a trapping or eradication program will be initiated. The type of control program selected will be contingent on the species of pest involved.

4.2 Monitoring Systems Maintenance

4.2.1 Groundwater Monitoring Wells

CECOS conducts regular inspections and maintenance of the groundwater wells as discussed in Section 3.3.5. The following additional information pertains to well redevelopment. Occasionally, sedimentation in groundwater monitoring wells creates difficulties in obtaining a representative sample from the well. The need for well redevelopment will be determined as follows. In monitoring wells without dedicated pumps, the total well depths will be measured at least once each year. For wells with dedicated pumps, the total depth of each well will be measured prior to pump installation. In the event a pump is removed from a well, the total depth of the well will be verified prior to reinstallation of the pump. If the measured depth is significantly different from the depth on the log, the well will be investigated further. If the differences in well depths indicate that sediment has accumulated to the extent that 20% or more of the well screen is filled with sediment, the well will be redeveloped. Wells may also be redeveloped if the purge/sample water has excessive turbidity. Wells will be redeveloped in general accordance with procedures in the latest version of Ohio EPA's TGM using techniques and equipment that are best suited for the well diameter, depth, and recharge rate.

Wells that may become obstructed or otherwise become unserviceable through time will be noted to Ohio EPA prior to the next semiannual DMP sampling event. The need for well abandonment and/or the installation of replacement wells will be discussed with Ohio EPA before undertaking the work.

4.2.2 Leak Detection System/SCMFs 9 and 10

During the post-closure care period, CECOS will continue to monitor the leak detectors as required under TSCA requirements. Water will be pumped from the leak detectors, when present, prior to sampling. CECOS will inspect the leak detectors quarterly for any surface signs or damage or intrusion. The operation of the pumps will be checked to ensure the

system is operating appropriately. Repairs to the pumps will be made as necessary to maintain the sampling schedule.

If routine TSCA monitoring indicates the presence of contaminants in the leak detection system, CECOS will notify Ohio EPA of the results and begin an investigation of the situation. This may include resampling to confirm or deny the detection. Should the investigation/resampling indicate that a release has occurred into the leak detection system, Ohio EPA will be immediately notified by telephone and in writing within seven days of the determination that a release has occurred.

4.2.3 Standpipe Level Monitoring

Improved pumps and/or electrical systems have been and will continue to be installed to keep the leachate removal system as safe and efficient as possible. The goal of the leachate system is to maintain leachate head levels in the cells at the lowest practical limit. The entire conveyance system (piping, tanks, and leachate treatment system) is inspected on a daily basis to verify the integrity of the system. Repairs are made as soon as possible. Spare pumps and parts are kept on-site so that historically most repairs are made within 24 hours of discovery. Once the leachate is pumped it must be transferred from the cells securely, and must meet disposal requirements at a treatment/disposal facility. Historically, leachate head levels in standpipes were measured daily to monitor the effectiveness of the leachate pumping program. With the installation of the automatic pumping system, daily standpipe head level measurements are no longer necessary. The pumps in the standpipes are inspected daily during the inspections to ensure they are operating to maintain proper head levels.

Standpipe levels will continue to be measured weekly to ensure that the automatic system is functioning properly. A water level indicator meter or similar equipment will be utilized to determine the depth to the nearest tenth of a foot from the permanent reference point marked on the standpipe to top of the leachate. Should the level exceed one foot of head over the top of the primary liner, the system will be checked to determine the cause for the elevated leachate head level.

The following actions are performed **daily** to identify any maintenance issues. The inspections are maintained on site and are available to Ohio EPA at their request.

- All standpipes are visually checked for integrity and the pumps in the standpipes are checked to ensure they are operating properly;
- All primary pipes/hoses from the standpipes to the collection tanks are checked for leaks by visually inspecting the leak detection capture points;
- All primary and secondary pumps, hoses, valves and any other above ground conveyances are inspected for evidence of deterioration, leaks, malfunctions or corrosion;
- The ground beneath or adjacent to the secondary leachate pipes/hoses is checked for evidence of leaks;
- All tanks, (leachate accumulation tanks, leachate treatment tanks and contaminated water storage tanks) overfill alarms are verified as operating;

- Overfill controls for the leachate accumulation tanks are inspected by manually lifting the float switch in each tank to ensure that the system is in proper working order;
- The exterior of all tanks and their associated secondary containment structures are inspected for evidence of corrosion and/or leakage. All visible welds (especially at plate intervals and where flanges and portals join the plate) to ensure there are no obvious signs or leakage. Corrosion resistant coatings are noted for peeling, spelling and other signs of general deterioration;
- The overall condition of the tank's secondary containment structure are inspected for cracks, holes, or deterioration of seams and joints; and
- The loading/unloading areas and sumps (if applicable) are inspected for presence of spills, cracks, leaks or deterioration.

The following actions are performed **monthly** to identify any maintenance issue. The inspections are maintained on site and are available to Ohio EPA at their request.

- The electrical boxes on the standpipes that operate the automatic pumps in the standpipes are inspected to ensure they are securely mounted, all electrical connections are tight, the electrical box covers are in place; and there is no wear on the electric lines; and
- The PVC piping encasing the electrical conduit that runs between the standpipes and the leachate accumulation buildings is checked to make certain the wires are protected and there is no sign of damage.

Preventative maintenance, such as replacement of the conveyance support structure is performed as needed. Jetting of collection lines is done when necessary to improve pumping efficiency. All preventative maintenance is performed with the goal of minimizing interruption of the pumping requirements. As stated previously, spare pumps and parts are kept on site so that most maintenance issues can be repaired within 24 hours of discovery. A generator is maintained on site so that power can be maintained to the standpipe pumps in cases of general electrical outage. The generator is inspected and serviced annually by the manufacturer's service provider. Copies of parts or third party service invoices, pumping logs, etc. are maintained on site and available for review by Ohio EPA at their request.

Should the system require shutdown for servicing, daily leachate head levels will be measured and recorded in the site operating record. In this instance, leachate from the standpipe will be pumped daily direct from the standpipe until the system returns to service, as follows:

- Before pumping, the leachate transfer line [one and one half inch (1.5-inch) rubber and wire reinforced construction hose or equivalent] will be stretched across the cap. The line will be pressurized with air. After the pressure reading on the gauge stabilizes at 10 psi, the line must hold that pressure for 10 minutes to pass the test;
- The leachate will be pumped into a vacuum truck. When pumping is finished, the valve at the end of the transfer line will be closed and the line capped;
- The transfer line will be evacuated using a vacuum truck; and

- Contents of the vacuum truck will be transferred to T-1 or T-101 in the leachate treatment system.

From time to time, siltation may occur in the standpipes which could result in a portion of the leachate collection system being clogged. On a quarterly basis, the level of the siltation will be determined utilizing a weighted tape to measure the depth to the top of the silt. The depth will be determined from the difference between the measured level of silt and the actual bottom (i.e., measured distance between the permanent reference point and the base of the standpipe where the submerged pump rests) of the standpipe. Should the level of silt in the standpipe interfere with the operation of the system or cause leachate levels to rise more than one foot above the top of the primary liner, silt shall be removed. This will be accomplished by "jetting" the silt, forming a silt slurry, and pumping the silt slurry from the standpipe. Additionally, standpipe L-12 has historically experienced obstruction problems with scaling. This obstruction is removed using high-pressure air jetting as needed.

During the active life of the facility, any failure of leachate discharge piping will result in an immediate deactivation of the affected line. The line will be removed from service and will be replaced immediately. In this case, alternate leachate pumping will be implemented as described above, if necessary.

Special care is taken during cold weather operations to ensure that lines are not damaged by freezing. Winter operations as described in Section 2.3.1 are used to protect the system while meeting the head level objective. The PVC piping encasing the electrical conduit that runs to the standpipes is replaced when it is impacted by the freeze/thaw effect.

Based on the waiver conditions to the minimum technology requirements of HSWA, specific notification conditions are required during the post-closure period for SCMF 9, as follows:

- Within 7 days of the presence of a leachate depth of one foot or more above the top liner in the primary leachate collection and removal system; and
- Within 15 days of known damage to the primary leachate collection and contingency sidewall system components; the notification should outline procedures planned to repair the damage and a projected schedule.

During the post-closure care period, CECOS will notify the Ohio EPA Director in writing if any of these conditions occur.

4.2.4 Gas Venting System

At a minimum, the granular activated carbon filter media in the gas venting system canisters will be replaced on an annual basis. More frequent changing of the media will occur if CECOS has reason to believe that gas breakthrough has occurred, as evidenced by the presence of volatile organic vapors being discharged out of the vent system. This would be detected with a photoionization analyzer or comparable equipment during the scheduled monthly inspections described above. The testing equipment's probe is placed inside the gas venting pipes to eliminate the possibility of wind dispersion of vapors. PVC elements of the vent riser system will be maintained on an as needed basis using traditional PVC repair techniques.

4.2.5 Sampling Equipment

All sampling equipment utilized for site maintenance (i.e., photoionization analyzers, pH meters, organic vapor analyzers (OVAs), etc.) will be operated, calibrated, maintained and routinely serviced in accordance with the manufacturer's specified requirements.

4.2.6 Underdrains SCMFs 3, 4/5, 6, 7, 8, 9, and 10

During the post-closure care period, CECOS will continue to monitor the underdrains as required under TSCA requirements. Water will be pumped from the underdrains, when present, prior to sampling. CECOS will inspect the underdrains quarterly for any surface signs or damage or intrusion. The operation of the pumps will be checked to ensure the system is operating appropriately. Repairs to the pumps will be made as necessary to maintain the sampling schedule.

If routine TSCA monitoring indicates the presence of contaminants in the underdrains, outside of the CMI area, CECOS will notify Ohio EPA of the results and begin an investigation of the situation. This may include resampling to confirm or deny the detection. Should the investigation/resampling indicate that a release has occurred into the underdrains, outside of the CMI area, Ohio EPA will be immediately notified by telephone and in writing within seven days of the determination that a release has occurred.

4.3 Security System Maintenance

During post-closure care, CECOS will maintain the integrity of the perimeter security fence and gate system. The integrity of the fence system will be assessed during the monthly inspection, as described in Section 3.3.3. The Site Manager will be responsible for coordinating repairs on the fence, gate and warning sign security system, as necessary.

During post-closure, the main entrance will be locked at all times except for when site personnel, approved contractor, or visitors are being admitted. Arrangements have been made to provide local authorities with a key to the main entrance. All other gates to the facility will remain locked at all times except for when being used for entrance or exit to the facility.

4.4 Leachate Treatment System Maintenance

CECOS will maintain the leachate treatment system to assure that it is operating at the highest efficiency achievable. To accomplish this, maintenance of the leachate treatment system will be conducted by facility personnel based on recommendations from equipment manufacturers and/or vendors. Copies of all maintenance manuals and records of maintenance activities performed will be kept in the site operating record and are available to Ohio EPA at their request.

The leachate treatment system will be inspected daily to make certain there are no leaks or breaches. All tanks and pumps will be inspected and the levels recorded in the storage tanks. The effluent will be sampled on a batch basis for PCBs. This sampling is to ensure the effectiveness of the treatment system in removing PCBs to concentrations required for offsite disposal. The effluent will also be sampled on an annual basis for the constituents detailed in Section 2.2 for overall disposal characterization purposes.

The volume of leachate generated from SCMFs 3 through 10 does not require the operation of the leachate treatment system every day. Repairs and preventative maintenance, including line jetting, will most often be completed during the weeks when the system is not operating. Repairs will be performed in a timely fashion to allow for the system to operate as needed. Equipment replacement or reworking, such as to the filter press, will be scheduled during the weeks the leachate treatment system is not operating.

The treatment system operator is knowledgeable in the operation of the system and in making minor repairs (i.e., changing filters, preventive maintenance, cleaning/oiling of pumps). Any major repairs will be outsourced to a qualified contractor.

The operator will ensure that the lime slurry pump is constantly running during treatment so that the lime does not harden before being added during the treatment process (the lime is added to increase the leachate pH). Care will also be taken to clean out the piping from lime residue.

5.0 CONTINGENCY PLANS FOR DAMAGE OR RELEASES CAUSED BY CONTAINMENT SYSTEM FAILURE OR SEVERE STORMS

In the event of any potential uncontrolled release of hazardous substances, the facility Contingency Plan will provide the primary necessary information and response procedures. The Contingency Plan is on file at the facility, is updated on a regular basis, and has been provided to all potential agencies responding to an emergency situation as required under the hazardous waste generator requirements in OAC Rules 3745-52-34 and 3745-54-51. This section provides specific information concerning releases from containment system failure or from severe weather conditions. The information provided herein is in addition to procedures set forth in the facility Contingency Plan.

5.1 Cover System Failure

Final cover failure may result from severe erosion, cracking caused by differential settling or slumping, penetration by deep-rooted vegetation, or burrowing animals. In the event that final cover failure results in the migration of waste residues to surface water, CECOS will initiate the following response actions immediately upon discovery:

- If contaminant migration is still occurring, such migration will be contained as close to the source as possible. Containment will consist of the placement of soil dikes around the source to mitigate the movement of contamination to site drainage systems. Soil for the containment dikes will be available on-site;
- Discharge point(s) for site drainage will be temporarily blocked or diked, if necessary, to mitigate the potential for off-site discharge;
- If containment release threatens surface water or off-site air quality, the Ohio EPA and the Clermont County Emergency Communication Center will be notified of the discovery immediately by telephone, and in writing within seven days. In the case of reportable quantity releases, the notification procedures found in the SPCC Plan will be implemented;
- Following containment of run-off, on-site water contained in site diversion and drainage systems will be sampled sequentially from the source to determine the extent of contamination. Sampling and analysis will be in accordance with the Detection Monitoring Sampling and Analysis Plan (see Section 10) for the parameters appropriate for the release;
- All water found to be contaminated will be removed by vacuum truck or temporary pumps into tanker trucks. Storage may be provided in the Contaminated Water Storage Tanks followed by transportation to an off-site TSDF;
- The area of the cover failure will be repaired by excavating and removing all contaminated cover materials. The excavated area will be repaired and rebuilt in a manner equivalent to the final cover design, and in accordance with the manufacturer's recommendations for repairing the HDPE geomembrane material. Any repairs to the geomembrane cover will be certified by an independent professional engineer that the repairs were made in accordance with standard industry practices; and
- After repair or cessation of the emergency, Ohio EPA will be notified by telephone before any operations in the affected area are resumed.

5.2 Extreme Storm Events

During extreme storm events (e.g., 100 year flood or rainfall in excess of the 25-year, 24-hour event), areas of the site may experience appreciable erosion beyond that which may occur during normal weathering. Drainage ditch and final cover areas may be significantly eroded which would require a contingency or emergency action. Smaller storm events will generally not require contingency actions since all the final caps and drainage ditches have been designed to accommodate at least the 25-year, 24-hour rainfall event.

Sand bags or similar erosion resistant devices will be positioned on or around the area of the final cover that is being subjected to the erosion until the episode has stopped. Sand bags or similar erosion resistant devices (such as riprap placement on embankments) will also be placed around drainage ditches to mitigate in-bank erosion. Sand bags will be placed along the banks as necessary to contain the storm flows within the banks of the drainage ditch.

Following recession of the flood event and stabilization of the situation, CECOS will initiate remedial actions as necessary in accordance with the cover repair and ditch maintenance procedures as described in Section 4.1.

6.0 CLOSURE OF HAZARDOUS WASTE UNITS

During the post-closure period several leachate handling systems will continue to be operated to provide temporary leachate storage and treatment as necessary. These units are:

- Contaminated Water Storage Tanks;
- Leachate Accumulation Tanks;
- Leachate Treatment System (Tanks);
- Truck Wash Facility; and
- Container Transfer Dock.

The Contaminated Water Storage Tanks, Leachate Accumulation Tanks, Container Transfer Dock, and Truck Wash Facility will be operated as less-than-90 day storage systems in accordance with OAC Rule 3745-52-34(A) and 40 CFR 262.34(a). The Leachate Treatment Tanks will be operated pursuant to OAC Rule 3745-55 and the Post-Closure Plan. All of the hazardous waste management units that will remain operational during post-closure are equipped with secondary containment. Areas where hazardous waste was managed, outside of the closed cells, which are subject to this Post-Closure Plan will be closed via the appropriate rule at that time. The timing of the closure for the hazardous waste units will be when they are permanently removed from service, or after the post-closure period ends, whichever is sooner.

6.1 Container Transfer Dock

The Container Transfer Dock consists of three separate storage areas and two access ramps, all of which are constructed of concrete. A concrete containment sump is included in each area. During post-closure operations, CECOS may choose to utilize only one or two of the storage bays within the container transfer dock. Since the entire dock was clean-closed under the site wide closure plan, only those areas utilized for hazardous waste storage during post-closure will undergo generator-status closure.

7.0 POST-CLOSURE NOTICES

The survey plat, prepared and certified by a professional land surveyor, was submitted to the Jackson Township Zoning Commission, Ohio EPA, and U.S. EPA on April 25, 1996 after Ohio EPA's acceptance of the "interim" certification of closure of each hazardous waste unit in accordance with OAC Rule 3754-66-16 and 40 CFR 265.116. The plat indicated the location and dimensions of landfill cells and other hazardous waste management units with respect to permanently surveyed benchmarks located on-site.

In accordance with OAC Rule 3745-66-19 and 40 CFR 265.119, CECOS submitted a record of the type, location, concentration of the hazardous constituent remaining in-situ, and quantity of hazardous waste disposed of in each SCMF. CECOS submitted this record to the Jackson Township Zoning Commission, Ohio EPA, and U.S. EPA on April 25, 1996, after Ohio EPA's acceptance of the "interim" certification of final closure for the CECOS facility.

On May 3, 1996, CECOS prepared the documentation records described below. The restrictions were recorded by the Clermont County Recorder on May 24, 1996. Copies of these records and the survey plat are presented in **Appendix C**. The restrictions were signed by Donald Schregardus, Director of the Ohio EPA.

- In accordance with state law, a notation on the deed to the facility property, or in some other instrument which is normally examined during title search, has been recorded that will in perpetuity notify any potential purchaser of the property that:
 - The Aber Road Facility has been used to manage hazardous wastes;
 - Future use of the facility property is restricted under OAC Rule 3745-27-13 and pursuant to the approved closure plan; and
 - Notice that the survey plat and record of the type, location and concentration of hazardous constituents to remain in-situ of at the Aber Road facility has been filed with the Jackson Township Zoning Commission, Ohio EPA, and U.S. EPA.

If CECOS intends to alter or modify its current use of the area, the Ohio EPA will be notified in writing of least 180 days prior to such change. Furthermore, CECOS will notify any subsequently purchaser(s) of the Facility property that use restrictions exist and will make a copy of the use restrictions available to such purchaser(s) at least 30 days prior to transfer of the property.

The notation on the deed to the Facility property may be modified or removed in the following way:

- CECOS may petition the Director of Ohio EPA to modify or remove the notation from the deed based on cause. The petition shall include evidence demonstrating:
 - The Area property has been cleaned up to a level which meets Ohio's closure of performance standard, in effect at the time of such petition, for residential land-use scenario; or
 - The Area has been sample tested and compared with background samples taken from land surrounding the Area which has been unaffected by past

treatment, storage, or disposal of hazardous waste, and such data shows that current conditions present at the Area are not statistically greater than background conditions.

- The petition will be considered by the Ohio EPA only when it presents new and relevant information not previously considered by the Agency. The Ohio EPA will issue a final determination based upon the criteria set forth above; and
- If the Ohio EPA denies the petition, it will send the petitioner a brief written response giving the reason for the denial.

8.0 POST-CLOSURE CERTIFICATION

In accordance with OAC Rule 3745-55-20 and 40 CFR 264.120, CECOS will submit a certification statement executed by CECOS and the independent registered professional engineer that the post-closure care period has been completed and that all hazardous waste management units have been closed in accordance with the approved closure plan. This certification will be submitted within 60 days of completing the 30-year post-closure care period for the entire facility.

It is anticipated that the independent registered professional engineer responsible for preparing the post-closure certification may not be the same individual as that responsible for participating in the inspections of the facility during the post-closure period.

CECOS will retain all inspection reports, groundwater/statistical reports, records of maintenance activities, etc., during the post-closure period such that the certifying engineer will have adequate documentation to assess whether post-closure care has been provided as stipulated in this plan. At the minimum, CECOS will require that the certifying engineer prepare a documentation report in support of the certification statement that includes the following:

- Activities conducted during inspections;
- Field reports documenting each on-site visit;
- List of CECOS records that were reviewed during the certification assessment period; and
- Closure of all leachate treatment and storage units has been completed in accordance with the approved closure plan.

CECOS is aware that per OAC Rule 3745-55-17 the possibility exists that the Director may extend the post-closure care period for any hazardous waste management unit or facility, if it is found that the extended period is needed in order to protect human health and the environment. On or about February 2022, CECOS will contact Ohio EPA to begin discussions on whether the Director is considering the need to extend the post-closure care period. If such an extension of the post-closure care period is being considered by the Director, CECOS will provide leachate and groundwater monitoring data necessary to assist the Director in making such a determination. This may include:

- Groundwater sampling and analysis data;
- Groundwater potentiometric maps;
- Groundwater modeling data, if applicable;
- All leachate data including sampling and analysis and volume data; and
- Facility inspection records, as applicable.

This data is available in the facility operating record maintained at the site.

If the Ohio EPA finds that an extension to the 30-year post-closure care period is required, CECOS may at any time request that the post-closure care period be shortened if, during that period, no further threat to human health and the environment exists per OAC Rule 3745-55-17(A) (2) (a). If an extension to the 30-year post-closure care period is required by the Ohio

EPA, CECOS reserves the right to conduct annual reviews of the data in order to determine the point at which the facility has met all post-closure care requirements. At that time(s), CECOS will request Ohio EPA approval for termination of post-closure care requirements.

9.0 POST-CLOSURE COST ESTIMATE AND FINANCIAL ASSURANCE

9.1 Cost Estimate

In accordance with OAC Rule 3745-55-44 and 40 CFR 264.144, CECOS has prepared a post-closure cost estimate for the Aber Road facility. This cost estimate is provided in **Appendix D**.

9.2 Financial Assurance

CECOS is providing financial assurance for post-closure care by use of closure insurance per OAC Rule 3745-55-43 (E) and 40 CFR 264.143 (e). The executed mechanism will be provided to Ohio EPA upon approval of this Post-Closure Plan.

10.0 DETECTION MONITORING SAMPLING AND ANALYSIS PLAN

10.1 Detection Monitoring Program

The Detection Monitoring Program (DMP) for the CECOS Aber Road Facility is patterned after detection monitoring requirements for permitted RCRA facilities (OAC Rules 3745-54-90 through 101). Components of the DMP include:

- Semiannual collection of groundwater samples from the site groundwater monitoring network;
- Analysis of groundwater samples for a list of site-specific indicator and water quality parameters;
- Statistical evaluation of indicator parameters to determine whether a statistically significant change in groundwater quality has occurred; and
- Amendment of the DMP, if warranted.

10.2 Sampling and Analysis Plan

This Detection Monitoring Sampling and Analysis Plan (SAP) has been prepared to maintain compliance with OAC Rules 3745-54-97 and 98. This version of the SAP supersedes all previous versions. The purpose of the SAP is to provide information and procedures or techniques for the following:

- Groundwater monitoring well network;
- Indicator and water quality parameters sampled;
- Methods of purging prior to sampling;
- Groundwater sampling methodology;
- Potentiometric surface maps with determination of groundwater flow rate and direction; and
- Laboratory analytical methods..

10.3 Groundwater Monitoring Well Network

Four water bearing zones have been identified and are currently monitored at the Aber Road Facility. These are (from most shallow to deepest) the Upper Sand, 880 Sand, Channel Sand, and Bedrock Till-Interface (BTI). **Figure 11** is a well location map including currently installed wells and piezometers that are part of the DMP network. The wells are color-coded by the zone in which they are screened. **Figures 12, 13, 14, and 15** contain the wells and piezometers for the Upper Sand, 880 Sand, Channel Sand, and BTI Zones, respectively. The point of compliance and monitoring network incorporate the Waste Management Area concept, in accordance with OAC Rule 3745-54-95. **Table 7** summarizes the wells that will be routinely sampled to monitor the groundwater quality at the Aber Road Facility. Available borehole logs for DMP monitoring wells and piezometers are included on a CD provided in **Appendix E**.

Per discussions with the Ohio EPA, CECOS has incorporated several existing wells that were not sampled as part of the previous DMP, as indicated on **Table 7**. Also based on

discussions with Ohio EPA, 11 new wells were installed in 2012 for sampling under the DMP (See **Table 7**).

The monitoring well network presented herein satisfies the regulatory requirements set forth in OAC Rules 3745-54-97(A-G) and 3745-54-98(A-D).

Any future wells will be installed following the procedures in the latest version of Ohio EPA's TGM, where applicable. For wells that will be used for routine water quality sampling, dedicated sampling pumps will be installed at each existing and future well in the routine DMP network. At least eight initial background samples will be collected from each installed well, on a quarterly basis, per discussions with Ohio EPA, technical review, and in accordance with OAC Rule 3745-54-97(G)(1). As-built well construction summaries and borehole logs will be submitted to Ohio EPA for newly installed wells.

Monitoring wells will contain dedicated equipment to avoid the potential for cross-contamination. Dedicated submersible pumps will be utilized for purging and sampling all DMP monitoring wells. If confirmed groundwater quality impact from a regulated unit has been identified, the wells with evidence of impact will generally be sampled last.

10.3.1 Monitoring Well Operations and Maintenance Procedures

An inspection program has been instituted at the Aber Road Facility to ensure that the monitoring wells perform to design specifications throughout the life of the monitoring program as detailed in Section 3.3.5. Each well is visually inspected to assure that access is readily available, to identify needed repairs or maintenance, and to verify that the well is capable of producing representative groundwater samples. Inspections are documented on a Maintenance Evaluation form and notification of the need for repair is made on the Corrective Action form, **Figures 9** and **10**, respectively. In addition, during routine groundwater monitoring, each well to be sampled for water quality is inspected to assure properly functioning dedicated purging/sampling equipment exists, where applicable. If a well is determined not to be operating properly or is in need of repair, appropriate measures will be taken prior to the next semiannual event.

Well redevelopment is discussed in Section 4.2.1. Wells that may become obstructed or otherwise become unserviceable through time will be noted to Ohio EPA prior to the next semiannual event. The need for well abandonment and/or replacement wells will be discussed with Ohio EPA before undertaking the work.

10.3.2 Measurement of Groundwater Elevations: Wells Available for Supplemental Sampling

On a semiannual basis, data to establish the static elevations of groundwater will be collected. The Potentiometric Surface Monitoring Network (**Figure 11; Table 8**) has been developed to include piezometers and monitoring wells across the site.

Data will include depths-to-static groundwater level as measured from a marked reference point on the top of the inner casing during each sampling event. Wells equipped with pumps will be measured from the survey mark on the pump cap. Groundwater elevation data will be measured to an accuracy of 0.01 foot. Immiscible layer detection will be conducted based on a visual analysis of the water level probe, water collected during purging and sampling, and

the results of the analytical program. If immiscible layers are detected they will be noted in the "Specific Comments" section of the field log.

Site-wide groundwater levels will be collected within a 24-hour period, if possible. However, due to the large number of wells requiring water level measurements (approximately 200 wells) and daylight limitations during certain parts of the year, it may not be feasible to collect all water levels in a 24-hour time period.

Potentiometric surface maps generated from the groundwater elevation events will be included with each semiannual groundwater statistical analysis report. In accordance with OAC Rule 3745-54-98(E), an evaluation of the groundwater flow rate and direction will be performed at least annually.

An asterisk has been placed on **Table 8** after wells that are likely viable for future sampling (i.e., 2-inch casing or bigger), if needed. Wells formerly part of the DMP, as well as piezometers, will be maintained in the event they are needed for future investigatory purposes. If it is determined that additional sampling is warranted outside the current detection monitoring well network, an attempt will be made to collect a representative sample from the appropriate piezometer(s). If an appropriate piezometer is not available, or a sample cannot be collected due to a well condition, an additional well may be installed (after discussion with the Ohio EPA). Dedicated pumps may not be installed in wells that are not part of the routine DMP network.

10.4 Indicator Parameters

Table 9 contains a summary of stabilization, water quality, and statistical indicator parameters for wells in the Upper Sand, 880 Sand, Channel Sand, and BTI Zones. The indicator parameter includes hazardous constituents that will provide reliable, early identification of a potential release from the regulated unit. The indicator parameters were determined in accordance with OAC Rules 3745-54-97(G) and 98(G) and Ohio EPA's input.

Because the monitoring zones contain clay and silt as well as sands and are often low-yielding, samples for dissolved metals will be field filtered to ensure representative samples are collected. Samples for metals will be field filtered using a 0.45-micron, high capacity, filter attached to the pump discharge tubing. The filtered sample will be pumped directly into the sample bottles. The flow rate will be adjusted to a rate that is capable of pushing water through the pump discharge tubing when collecting dissolved metal aliquots.

When sampling a bailed well (see Section 10.5.2.2) for dissolved metals, an aliquot will be collected in a new, unpreserved (neat) bottle. The aliquot will be field filtered immediately using a peristaltic or piston pump. The aliquot will travel through a 0.45-micron, high capacity filter attached to disposable tubing and will be collected directly into the sample bottle. Tubing and filters will be discarded after use.

Due to a lack of confirmed detections over a 13 year period between 1998 and 2011, and in concurrence with Ohio EPA, semi-volatile organic compounds (SVOCs) are no longer considered appropriate detection monitoring indicator parameters for the facility and will not be sampled as part of the DMP. SVOCs will continue to be included in the site-specific list of constituents for Appendix IX sampling. Throughout this Plan, references to the Appendix IX sampling list refers to the VOCs listed in the Appendix to OAC Rule 3745-54-98 and other

parameters (SVOCs, pesticides, herbicides, PCBs, metals, etc.) taken from Table 1-1 of the approved November 1997 CMI Quality Assurance Project Plan (QAPjP). Specific sampling and analysis requirements for the DMP parameters, including minimum container size, preservatives, analytical methods, and method holding times, are outlined in **Table 10**.

10.4.1 Stabilization Parameters

Field stabilization parameters were selected based on the most recent Ohio EPA TGM protocol. As discussed in Sections 10.5.2.1.1 and 10.5.2.2.1, field pH, specific conductance, and temperature will be used for stabilization purposes during purging at each well in the DMP. The stabilization parameters will not be statistically evaluated.

10.4.2 Water Quality Parameters

In addition to the stabilization parameters, field turbidity, dissolved oxygen (DO), and oxidation/reduction potential (ORP) measurements will be collected once each event at each DMP well, after purging is completed and prior to sample collection. None of these parameters will be statistically evaluated.

The eight RCRA metals listed on **Table 9** will be collected at wells screened in the Upper Sand and 880 Sand Zones. Data collected for the RCRA metals in Upper Sand and 880 Sand Zone wells will be evaluated qualitatively through time series plots, which will be presented and discussed in report submittals to identify potential changes that may warrant further evaluation. Statistical evaluations will not be performed on RCRA metals in the Upper Sand and 880 Sand Zones.

10.4.3 Statistical Indicator Parameters

The VOCs listed on **Table 11** are the VOCs in the appendix to OAC Rule 3745-54-98, as well as 9 additional parameters typically analyzed as SVOCs as agreed upon with Ohio EPA (62 constituents total) that can be detected using SW-846 Method 8260B (62 constituents total). These 62 parameters will hereafter be referred to as "VOCs." The VOCs on **Table 11** will be analyzed and evaluated as detection monitoring indicator parameters for each of the four water-bearing zones.

Downgradient wells in the Upper Sand Zone and 880 Sand Zone will be statistically evaluated for 62 VOCs.

Downgradient wells in the Channel Sand and BTI Zones will be statistically evaluated for the eight RCRA metals, as well as for the 62 VOCs.

Newly installed wells and wells new to the DMP (MP-214BR and MP-237) will be statistically evaluated for the 62 VOCs beginning with the first monitoring event following implementation of this Plan and/or the installation of the wells. Background will not be collected for VOCs.

10.5 Groundwater Sampling Methodology

The following sections describe groundwater sample collection, handling, and reporting procedures. The Aber Road Facility or its designated consultant will follow these guidelines during sample collection. The intent of these guidelines is to provide procedures designed to

yield representative and comparable analytical data from each monitoring well, during each sampling event.

Three principal steps in collecting groundwater samples from monitoring wells are:

- Measuring static groundwater levels;
- Purging well casings (or low-flow purging) to stabilization; and
- Collecting and preserving samples.

10.5.1 Calculations of Groundwater Level, Total Well Depth, and Well Volume

Water level measurements will be made at the surveyed reference point using a properly decontaminated, battery-operated electronic water level meter with audible signal and calibrated tape or its equivalent. Data to establish the static elevations of groundwater will be collected prior to purging. Data will include both depth-to-water levels and updated total well depths as measured from a marked reference point on the top of the inner casing during each sampling event, if measured. Wells equipped with pumps will be measured from the mark on the pump cap. For wells with dedicated pumps, the total depths will be measured when pumps are removed for maintenance. Otherwise, the well construction diagram will provide total depths whenever the pump makes total depth measurements impractical.

Water level measuring devices coming in contact with groundwater will be thoroughly washed with a non-phosphate detergent and rinsed with deionized water prior to use in each well. Groundwater elevations will be obtained by subtracting the measured depth to groundwater from the surveyed top of inner casing elevation at each well. Total well depth (either measured or assigned per the well construction diagrams) will be used to aid in calculating the initial groundwater volume of each well. The difference between total well depth and depth-to-water level is the stabilized height of the groundwater column in the well. These measurements will be used to determine the static well volume (in gallons) of groundwater in each well as follows:

1. In order to obtain the height (H) of the groundwater column, measure the total depth (TD) of the well and subtract the static measured depth (SMD) of the water level.

$$H = TD - SMD$$

2. The following formula may be used to calculate the static well volume (in gallons) of groundwater:

$$V = (H) \times (F)$$

Where:

- V = well volume in gallons.
- H = height of groundwater column in the well in feet.
- F = factor for volume of 1-foot section of casing in gallons.
 - 0.163 = gallons per foot of depth constant for a 2-inch well.
 - 0.653 = gallons per foot of depth constant for a 4-inch well.

This well volume will be multiplied by three to calculate the minimum required purge volume (when purging volumetrically).

10.5.2 Monitoring Well Purging Procedures

Purging wells prior to sample collection is necessary to remove stagnant water that may not be representative of the groundwater. Purging will be performed at a rate as close as possible to the recharge/recovery rate of the well. Wells will be purged using dedicated submersible pumps, such as the Grundfos Rediflo 2, a bladder pump, or similar device. It is expected that turbidity will be relatively low due to the use of dedicated pumps as the sampling apparatus at each well; however, slightly higher turbidity readings may occur in wells that purge dry.

On-site purge water from downgradient wells will be collected in containers and labeled "P.C. Purge Water." This purge water will be handled as potentially contaminated. Currently, the purge water from downgradient wells is conservatively managed and disposed with F039 liquids. Purge water that is shown to be uncontaminated based on past sample results may be disposed on the ground downgradient of the wellhead at the time of sampling. Purge water from upgradient background monitoring wells will be discarded on the ground away from the wellhead.

10.5.2.1 Pump Purging

10.5.2.1.1 Volume Sampling

Purging may be performed by removing a minimum of three well volumes (calculated as discussed in Section 10.5.1), prior to sampling, except when a well purges dry before three well volumes have been evacuated. This ensures that samples are drawn from formation water, not from stagnant water left in the well between sampling events. The purge rate and volume of groundwater purged from each well will be measured using a graduated bucket. In addition to removing three well volumes, field stabilization parameters including pH, specific conductance, and temperature will be monitored and recorded on a field log.

Stabilization parameters will be collected every one-half ($\frac{1}{2}$) well volume after an initial one to one and one-half ($1 - 1\frac{1}{2}$) well volumes are purged. The volume removed between readings may be adjusted as well-specific information is developed. Field meter or flow-through cells that allow continuous monitoring of stabilization parameters may be used. When using a flow through cell, the capacity of the cell will be such that the flow of water in the cell is replaced between measurements of the stabilization parameters.

Purging will be considered complete when at least three well volumes have been removed and the following field parameters have stabilized for a minimum of three consecutive readings:

pH	+/- 0.1 S.U.
Specific Conductance	+/- 3% umhos/cm
Temperature	+/- 0.5 Degrees Celsius

Turbidity, DO, and ORP, in addition to pH, specific conductance, and temperature, will be measured at the end of purging. Turbidity, DO, and ORP will not be used as stabilization parameters. All field measurements, including the volume of water purged at the time of each field parameter measurement, and the date and time of sample collection will be recorded on the field log. A depth-to-water measurement will also be collected after purging but prior to sample collection.

Upon removal of three well volumes and equilibrium of field water quality parameters, the well will be sampled. If one or more of the stabilization criteria are not met after five well volumes have been purged, the sample will be collected. If a well purges dry prior to three volumes and/or equilibrium, the well will be evacuated to the lowest reasonable level, allowed to recover, and then sampled within 24 hours of purging. If a well does not recover sufficiently to fill the sample bottles after 24 hours, the samplers may attempt to collect additional volume during consecutive 24-hour periods, as practical. The volume of water purged will be recorded on the field log.

10.5.2.1.2 Low-Flow Sampling

Low-flow (minimal drawdown) ground-water sampling procedures may be used for purging and sampling monitoring wells that will sustain a pumping rate of at least 100 ml/min. Water will be purged from these wells at low rates in order to minimize drawdown in the well during purging and sampling. Depth-to-water measurements and field water quality parameters specific conductance, pH, and temperature collected during purging will be used as criteria to determine when purging has been completed. Sample collection will be initiated immediately after purging at each well.

Prior to purging, a static water level will be measured and the time of measurement will be recorded on the field form (See **Figure 16** for an example field form). Depth-to-water measurements recorded during purging to verify water level stabilization also will be recorded on this form.

During purging, wells will be pumped at very low rates. Purging rates in the range of 0.1-0.5 L/min (100-500 ml/min) typically will be used and no well will be purged in excess of 1 L/min (1000 ml/min). Stabilization of the water column will be considered achieved when three consecutive water level measurements vary by 0.3 foot or less at a pumping rate of no less than 100 ml/min. If a bladder pump is used, the manufacturer's recommendations will be used for adjusting the emptying/filling cycle to minimize the potential for turbid flow.

Stabilization measurements will begin after drawdown of the water level has stabilized. Depth-to-water measurements and water quality parameter measurements of pH, specific conductance, and temperature typically will be conducted every 3-5 minutes during purging. If a meter equipped with a flow cell is used, the volume of the flow cell should be purged between field measurements. Stabilization will be considered achieved and purging will be considered complete when three consecutive measurements vary by no more than:

Depth-to-Water	0.3 ft
pH	+/- 0.1 S.U.
Specific Conductance	+/- 3% umhos/cm

Samples will be collected immediately after purging is complete at each well. Turbidity, DO, and ORP, in addition to depth-to-water, pH, specific conductance, and temperature, will be measured at the end of purging. Turbidity, DO, and ORP will not be used as stabilization parameters. All field measurements, including the volume of water purged at the time of each field parameter measurement, and the date and time of sample collection will be recorded on the field form.

10.5.2.1.3 Minimal Purging

The goal of minimal purging is to sample only water from the screened interval of the well. Therefore, water levels will be monitored during sample collection and drawdown will not be permitted to exceed the distance between the pump intake and the top of the screen. If the maximum drawdown is reached prior to filling a complete bottle set, sampling will be discontinued and resumed when sufficient water has recovered in the well and no later than 24 hours after sampling. Maximum drawdowns for wells purged using this method will be recorded on the field form.

Purging and sampling with a bailer will only be used in the event that a dedicated pump is inoperable or if a well must be sampled that lacks a dedicated pump because it is not part of the routine DMP sampling network. Only bailers and monofilament line that will not alter the sample parameters are permissible when bailer purging is required. Dedicated stainless steel bailers, dedicated/non-dedicated PVC bailers, or dedicated/non-dedicated polyethylene bailers will be used for sampling. Non-dedicated bailers will be properly decontaminated following procedures described in Section 10.5.4. In the event that a tripod-mounted downrigger style reel is used, the following procedure will be used:

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- The latch will also be rinsed with deionized water prior to hooking it on the bailer;
- After cleaning the line, the bailer will be lowered slowly in the water column until submerged; and
- The bailer will be retrieved slowly, recording the actual volume removed as the well is continuously bailed until the purge requirements in Section 10.5.2.1.1 are achieved.

10.5.3 Sample Collection

Groundwater monitoring wells will be sampled immediately after completion of purging in moderate to high yield wells. For monitoring wells that purge dry, sample collection will take place as soon as practical; i.e., within 24 hours of purging if the monitoring well has recharged sufficiently. If a well does not recover sufficiently to fill the sample bottles after 24 hours, the samplers may attempt to collect additional volume during consecutive 24-hour periods, as practical.

Groundwater will be analyzed for the parameters listed on **Table 9**. The site will utilize the analytical procedures provided in the most current edition of EPA report SW-846 "Test Methods for Evaluating Solid Waste." **Table 10** lists containers, preservation requirements, analytical methods, and holding times for each parameter.

Samples for metals will be field filtered using a 0.45-micron, high capacity, filter attached to the pump discharge tubing. The filtered sample will be pumped directly into the sample bottle. The flow rate will be adjusted to a rate that is capable of pushing water through the pump discharge tubing when collecting dissolved metal aliquots.

When sampling a bailed well for dissolved metals, an aliquot will be collected in a new, unpreserved (neat) bottle. The aliquot will be field filtered immediately using a peristaltic or piston pump. The aliquot will travel through a 0.45-micron, high capacity filter attached to disposable tubing and will be collected directly into the sample bottle. Tubing and filters will be discarded after use.

10.5.4 Equipment Decontamination

If utilized, all non-dedicated purging and sampling equipment, including bailers, pumps, and water level indicators will be cleaned prior to use in each well. This does not apply to disposable equipment. A wash with a non-phosphate detergent (such as Liquinox) and a thorough rinse, both inside and out, with deionized or distilled water is the minimum acceptable cleaning method for non-dedicated reusable sampling equipment. Field parameter meters will be rinsed between wells with clean water. Any disposable equipment such as polyethylene bailers and monofilament will be properly disposed.

10.5.5 Sample Handling

Sample handling and preservation techniques will depend on the analytical parameters. Sample bottles will be supplied by the laboratory in the correct sizes, quantity, and with any applicable preservatives. Groundwater samples will be collected in the same order at each well. For DMP sampling events, this involves collecting VOCs first, then dissolved metals. The purpose of sample preservation is to stabilize parameters of interest by retarding chemical or biological changes. Methods of preservation are generally limited to pH

adjustment, chemical addition, and cooling. Field parameter measurements (DO, ORP, pH, specific conductance, temperature, and turbidity) will be collected prior to sample collection.

VOC sample containers will be completely filled to form a meniscus and capped promptly to minimize volatilization. VOC containers will be checked for air bubbles after filling and capping. VOC sample bottles will be discarded and a new bottle will be filled if significant air bubbles occur. If VOC samples could not be taken without significant air bubbles, a notation will be made in the field logbook and/or field form and the appropriate chain-of-custody.

Proper preservation will help ensure that samples are representative of groundwater. Aliquots for dissolved metal analysis will be filtered at the sample location using an in-line disposable 0.45 micron filter cartridge, or similar device. Samples will be collected to minimize disturbance using appropriate sampling techniques for collecting representative groundwater samples. Field measurements (i.e. DO, temperature, pH, ORP, turbidity, and specific conductance) will be taken in a flow through cell or on a portion of the sample that was placed in a separate field container and will not be analyzed for any other parameters.

Completed sample sets will be stored on-site at or below 4 degrees Celsius until shipment to the analytical laboratory.

10.5.6 Sample Documentation and Chain-of-Custody

The Chain-of-Custody (COC) records document the history of collection, transfer, and transport of each sample. The COC record facilitates tracing the possession and handling of each sample from the time of field collection through laboratory analysis. Each individual responsible for the samples from the time of collection to the time they are received by the laboratory will be consecutively documented on the COC record. Each sample shipped, including trip blanks and other QA/QC samples, will be identified on the COC. The COC will include field and laboratory information to provide effective sample tracking and to ensure that samples are properly identified, preserved, and analyzed. An example of a COC form is located in **Figure 17**.

Sample labels identify samples in a unique manner. Sample labels will include name of the site, name of sampler(s) (initials are sufficient), well designation, date and time of sample collection, any added preservatives, and analysis requested. An indelible pen or marker will be used to complete sample labels. The sampler(s) will take measures to secure and protect the sample labels to ensure legibility at the laboratory, and deviations from required procedures will be noted in the field logbook and/or field form, as well as the applicable COC, if necessary.

A seal will be placed on the sample coolers prior to transport to confirm that containers are not opened or otherwise compromised prior to their receipt at the analytical laboratory. In addition, the field log books or field forms will be completed to document information about each sample collected from each monitoring point in the groundwater monitoring program.

10.5.7 Field Quality Assurance/Quality Control Samples

Field QA/QC samples will be collected as part of the groundwater sampling program. Quality assurance addresses the accuracy and repeatability of analytical results. Quality assurance

is accomplished by incorporating field duplicate samples and matrix spike/matrix spike duplicate (MS/MSD) samples into the analytical program. Quality control addresses preserving the integrity of samples in the field and shipping phases of collection. Quality control is accomplished by incorporating trip blanks, field blanks, and equipment (rinsate) blanks (if non-dedicated equipment is used) into the analytical program. The collection of field QA/QC samples is based in general accordance with procedures in the latest version of Ohio EPA's TGM.

10.5.7.1 Trip Blanks

One trip blank will be collected per semiannual DMP monitoring event and during any resampling event involving VOCs. Trip blanks consist of deionized water placed in appropriate sample containers by the analytical laboratory and included in the shipping container with the other (empty) sample containers prior to shipment. The trip blank sample accompanies site groundwater samples sent back to the laboratory and is analyzed for VOCs. Trip blanks assess the potential influences of transport-induced contamination of the samples and can also be used to assess potential laboratory contamination.

10.5.7.2 Field Blanks

One field blank (including all DMP parameters) will be collected per semiannual DMP monitoring event. If new statistically significant detections occur, a verification resampling event will be conducted. Field blanks may be collected during verification resampling. A field blank will be collected during verification resampling for VOC detections. Field blanks consist of deionized water poured into sample containers at the site during the sampling event and under the same environmental conditions as the monitoring well samples. If collected, the field blank will be analyzed for the same parameters as other samples collected for the day.

10.5.7.3 Equipment Blanks

Since dedicated purging and sampling equipment will be used at each groundwater monitoring well, equipment blanks will generally not be collected at the Aber Road Facility. If non-dedicated, non-disposable purging and sampling equipment is used, the effectiveness of cleaning and decontamination procedures will be verified by collecting and analyzing an equipment blank. After decontamination, equipment blanks are prepared by passing deionized or distilled water through a cleaned sampling apparatus and collecting it into clean sample containers. Equipment blanks will be handled and analyzed in the same manner as other samples being collected. A minimum of one equipment blank will be collected (when non-dedicated, non-disposable purging and sampling equipment is used) to analyze the effectiveness of cleaning and decontamination procedures.

10.5.7.4 Field Duplicates

Field duplicate samples are an extra set of samples collected from a certain monitoring point. This set of samples is independent of the primary sample set but collected as close as possible to the primary set in both location and time. Field duplicates provide an indication of the variability in analytical results associated with sampling and laboratory procedures. A minimum of one field duplicate will be collected for each twenty monitoring well samples. Duplicate samples will generally not be collected during verification resampling events or background events that involve a small number of wells. Field duplicates will be labeled in

such a manner so that persons performing laboratory analyses are not able to distinguish duplicates from other collected samples (i.e. “blind duplicates”). Blind duplicates eliminate the possibility of laboratory bias reporting analytical results.

10.5.7.5 Matrix Spike/Matrix Spike Duplicates

One matrix spike sample and one matrix spike duplicate sample will be collected and analyzed with the site samples during each routine sampling event or each 14-day calendar period if a sampling event spans more than 14 days. The matrix spike is used to determine the bias of a method in a given sample matrix. Matrix spike duplicates are intra-laboratory split samples spiked with identical concentrations of target analyte(s). Matrix spikes and matrix spike duplicates are used to document the precision and bias of a method in a given sample matrix.

10.6 Field Activities, Documentation, and Reporting

10.6.1 Field Activities

Field activities will be conducted in a manner consistent with safe and proper work practices. Quality control checks will be incorporated into the sampling and analysis program. Quality control checks will be accomplished by ensuring that proper field calibration, sampling, transporting, analytical, and documentation procedures are followed.

Each laboratory will have standard operating procedures and maintain full documentation of analytical work. Groundwater monitoring results will be submitted via electronic data delivery (EDD) techniques to the appropriate party performing statistical analyses and summary reporting.

10.6.2 Field Equipment

Field parameters will be measured as required using commercially available, portable metering equipment such as a pH meter, conductivity meter, temperature probe, turbidity meter, DO meter, ORP meter, and water level probe. Calibration procedures and frequencies for these instruments will be consistent with those recommended by the manufacturer(s), and as discussed below. Calibration (and recalibration) date, time, and results will be recorded on a form or in a log book along an indication of equipment maintenance performed associated with the sampling event. Calibration will be checked prior to beginning the sampling event. Equipment malfunctions and measures to correct malfunctions will be documented in the field log book and/or field form. Any meter that cannot maintain calibration will be repaired or replaced prior to use.

pH Meter - The pH meter will be calibrated with standard buffer solutions prior to field use. The buffer solutions will have approximate pH values of 4.0, 7.0, and 10.0 and will be traceable to the National Institute of Standards and Technology (NIST). In the field, the meter will be calibrated daily with buffer solutions before use, checked with a pH 7.0 buffer solution for drift if anomalous readings are observed, and recalibrated if necessary. The pH meter will be calibrated following the manufacturer's specifications. During extended periods between measurements, the pH probe should be stored in the protective boot.

Temperature Probe - Sample temperatures are measured with a temperature probe. According to manufacturers' instructions, temperature probes do not require calibration. However, if anomalous temperatures are observed, the test probe will be checked against another instrument and will be replaced if found to be inaccurate.

Specific Conductance Meter - The conductivity cells of the specific conductance meter will be cleaned and checked against a known conductance standard(s) prior to field sampling. The standard(s) will be traceable to NIST. In the field, the instrument will be calibrated at least daily, checked for drift if anomalous readings are observed, and recalibrated if necessary. Calibration will be according to the manufacturer's specifications.

Turbidity Meter - Particles in turbid water will cause light to scatter, giving it a cloudy appearance. The meter determines turbidity by measuring the amount of scatter when a light is passed through a sample. Readings are accomplished by placing a small amount of sample in a glass vial and placing the vial in the instrument. The vial will be rinsed with distilled or deionized water between readings. Care will be taken to keep the outside of the vial clean and free of fingerprints and condensation.

Field turbidity meters do not require frequent calibration. Instead, the meter will be calibrated once every three months and the meter will be checked every day during sampling using a known standard provided by the manufacturer. If the meter does not read to within 5 percent of the known value of the standard, it will be recalibrated in the field or a replacement meter will be used. Meters will be kept away from extreme temperatures and weather conditions as much as possible.

ORP Meters – The meters for measuring ORP will be checked and/or calibrated to manufacturer's specifications prior to use each day.

DO Meters – The meters for measuring DO will be checked and/or calibrated to manufacturer's specifications prior to use each day.

Sampling equipment will not be placed directly on the ground or in other potentially contaminated areas.

10.6.3 Field Documentation

Field documentation will be maintained on a continuing basis for this project. Either field logbooks or field forms will include field observations, purging, and well sampling details. Additionally, field documentation will contain the following information:

- Site name;
- Site well designation;
- Sample collector's name (or initials) and affiliation (e.g., landfill, laboratory, or contract personnel);
- Weather conditions (e.g., rain, snow, fog, etc.) that could affect sample;
- General condition of well and wellhead (note damage or suspected tampering);
- Type of purging and/or sampling device used;
- Static (pre-purge) depth-to-water;

- Total depth (or depth-to-dedicated pump) from top of inner casing;
- Volume of water in the well (traditional purging only) and purge volume with calculation;
- Starting and ending times for well purging;
- Approximate purging rate;
- Water level measurement at time of sample collection;
- Sample collection date and time;
- Field measurements;
- Sample appearance;
- Any indication of redevelopment required; and
- Any additional notes or comments pertinent to the sampling process.

An example of a field form is included as **Figure 16**.

10.6.4 Reporting Requirements

After analytical results are available, the groundwater monitoring data will be statistically evaluated using the procedures and schedule described in the Groundwater Statistical Analysis Plan (Section 11).

The results of the groundwater monitoring and the statistical analysis will be reported on the schedule listed below.

- Spring (April-May) Semiannual Detection Monitoring Report for Groundwater Monitoring Wells;
 - To include analytical results for monitoring wells, statistical evaluation, and potentiometric surface maps for the Spring event.
 - Reported within 90 days of the completion of the sampling event in hard copy and electronic form.
- Fall (October-November) Semiannual Detection Monitoring Report for Groundwater Monitoring Wells;
 - To include analytical results for monitoring wells, statistical evaluation and potentiometric surface maps for the Fall event.
 - Reported within 90 days of completion of the sampling event in hard copy and electronic form.
- A supplemental annual groundwater report will be submitted to Ohio EPA-Division of Materials and Waste Management (DMWM) by March 1st of each year and will include the previous year's groundwater monitoring information required by OAC Rules 3745-65-75 and 3745-54-75, where applicable. The facility will be submitting hard copies of the routine groundwater monitoring information semiannually. Components of the Ohio EPA supplemental annual groundwater report forms and instructions not previously submitted, such as the facility's electronic database, will be included in the annual report only.

Reports will be signed and certified as discussed in OAC Rule 3745-50-58(K).

11.0 GROUNDWATER STATISTICAL ANALYSIS PLAN

11.1 Statistical Evaluations

The following Groundwater Statistical Analysis Plan (StAP) has been prepared to outline the methods and procedures which will be utilized for statistically evaluating groundwater detection monitoring data collected at the Aber Road Facility. This StAP is intended to update and supersede all previous statistical evaluation procedures for the groundwater DMP. The statistical approach presented herein has been developed to comply with OAC Rules 3745-54-90 to 3745-54-101.

11.2 Statistical Approach

Downgradient wells listed on **Table 7** will be statistically evaluated for their zone-specific RCRA indicator parameters on a semiannual basis per OAC Rule 3745-54-98(D). The procedures described in Sections 11.2.1 through 11.2.5 below apply to the inorganic parameters listed in **Table 9** for the Channel Sand and BTI Zones. Wells in the Upper Sand and 880 Sand Zones will be statistically evaluated for VOCs only, as discussed in Section 10.4. VOCs listed on **Table 9** will be evaluated separately, as described in Section 11.2.6 below.

Figure 18 is a flow chart outlining the DMP sampling and reporting processes to meet regulatory compliance requirements listed in OAC Rule 3745-54-98.

11.2.1 Statistical Software

The statistical evaluation software program, *SanitasTM* or equivalent, will be utilized to statistically evaluate the inorganic groundwater data during detection monitoring. An equivalent software package may be utilized if it complies with the statistical procedures allowed under U.S. EPA and Ohio EPA regulations, policy, and guidance. The selected statistical methods contained within this StAP (i.e. parametric and nonparametric prediction limits) have been prepared following the recommendations contained in the March 2009 U.S. EPA document entitled "Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance", where applicable. Current Ohio EPA regulations, guidance, policy, and standard practices for statistical evaluations have been applied to the groundwater monitoring data for the units monitored under the DMP. Any changes in statistical protocol will first be approved by the Ohio EPA before implementation. Per OAC Rule 3745-54-97(H), statistical evaluations will be performed on parameters listed in this StAP.

11.2.2 Background Data

In order to facilitate the reduction of statistical false positives and false negatives, and to comply with OAC Rule 3745-54-97(H), intra-well statistical methods, with resampling, will be utilized at the Facility. Per OAC Rule 3745-54-97(I)(6), since significant spatial and temporal variability exists across the units monitored under the DMP, intra-well statistical methods are best-suited for the StAP. Therefore, intra-well prediction limit analysis will be the statistical method applied to inorganic parameters collected at all DMP wells except upgradient wells that were used as background for historic inter-well statistics (indicated with "*" on **Table 7**). Upgradient wells are not required to be

statistically evaluated under OAC Rule 3745-54-98. Separate statistical tests will be completed for each hazardous parameter as indicated in OAC Rule 3745-54-97(H).

Practical quantitation limits (PQLs) are taken from the approved November 1997 CMI QAPjP with the exception of PQLs that were at or above established National Primary Drinking Water Standards-Maximum Contaminant Levels (MCLs). Where achievable by the analytical laboratory, PQLs for these parameters (such as arsenic) have been revised to be below MCLs. In a few instances laboratory PQLs were above QAPjP PQLs. In these cases, PQLs for this Plan were updated to meet current laboratory PQLs. PQLs for DMP parameters are listed on **Table 11**. If a PQL for an inorganic statistical parameter is lowered in the future, background will be updated every two years until a minimum of eight routine observations are available at the new PQL.

Table 9 includes a summary of the statistical indicator parameters for each zone. Of the eight RCRA metals listed on **Table 9**, only dissolved arsenic and dissolved chromium were part of the previous approved indicator parameter list under the March 1994 DMP. Quarterly background data collection for the BTI and Channel Sand wells was completed in July 2014. The background periods used for dissolved arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver are shown on the summary tables included in Appendix G for the Channel Sand wells and Appendix H for the BTI wells. An electronic data file containing groundwater data collected from October 1997 through July 2014 is included in **Appendix F**.

As discussed in Section 10.4, the eight RCRA metals will be analyzed on a semiannual basis at Upper Sand and 880 Sand DMP wells and will be qualitatively evaluated for those zones in each semiannual report. In the event that the 62 indicator parameter VOCs used to statistically evaluate semiannual groundwater quality for the Upper Sand and 880 Sand Zones alone are deemed to no longer be effective for identifying a potential release of hazardous constituents from the regulated units, Ohio EPA may request that CECOS also begin statistically evaluating the eight RCRA metals analyzed semiannually for those zones (See **Table 9**). In accordance with the appendix to OAC Rule 3745-50-51, such a change to the monitoring program would require that the Site submit a request for Ohio EPA approval to implement a Class 2 amendment to the Post-Closure Plan.

Prior to October 1997, six different analytical laboratories were used to analyze Aber Road Facility groundwater samples. These laboratories used different PQLs and methods based on instrument limitations. To provide more consistency with laboratory analytical and reporting practices, background for dissolved arsenic and dissolved chromium is being utilized beginning with the October 1997 event. Exygen Research (Exygen) was the analytical laboratory for the Aber Road Facility from October 1997 through January 2006. TestAmerica, Inc.-Buffalo (TestAmerica) was subsequently contracted as the analytical laboratory.

Metals analyzed by Exygen were reported down to the method detection limit (MDL) and PQLs were not listed in Exygen's analytical reports or in electronic data files. The PQLs during that period were based on the November 1997 QAPjP. Therefore, results between the MDL and PQL were flagged by Exygen as estimated with a "J" flag. The intra-laboratory PQLs were not listed in Exygen's analytical reports and may have varied somewhat between events or between samples due to multiple factors such as sample

matrix affects, QA/QC, or instrument performance. For statistical purposes, estimated values will be treated as non-detect results at the QAPjP PQL and Exygen non-detects will be listed as <QAPjP PQL.

TestAmerica began analyzing Aber Road Facility samples in April 2006. Revisions to PQLs at the time of the laboratory switch are indicated in a February 14, 2006 CECOS document entitled Proposed Modifications to Quality Assurance Project Plan Corrective Measures Implementation, CECOS International, Inc., Aber Road Facility, Ohio and were approved by U.S. EPA in a letter dated March 10, 2006. In addition, based on discussions with Ohio EPA, the PQL for arsenic was lowered starting with the October 2010 event to be below the MCL.

New wells included in the DMP network will require a minimum of eight initial background observations (collected quarterly for two years) prior to initiating statistical evaluations for inorganic indicator parameters. This frequency will ensure independent samples are collected, in accordance with OAC Rule 3745-54-97(G)(1). Additional quarterly background events may be necessary if outliers are identified in the initial eight results for a well/constituent. These wells will be statistically evaluated for VOCs beginning with the first monitoring event following implementation of this Plan and/or the installation of the wells. Background will not be collected for VOCs.

11.2.3 Background Updates

Background data will be updated periodically to minimize the occurrence of false positive statistical results and increase statistical power. Updating the background will allow for a more accurate determination of the background mean and standard deviation for each well and parameter. Background updates will be performed by incorporating a minimum of four new observations into background.

The new background (previous background plus new observations) will be checked for statistically significant increasing trends. If a statistically significant increasing trend is identified, an evaluation will be performed to determine if the trend is due to a release from the facility. Background will not be updated in cases where a statistically significant trend has been identified unless it can be successfully demonstrated that the trend is not the result of a release of hazardous constituents from the facility.

Background updates will be cumulative and not based on a moving window unless a statistically significant trend is identified in the background data. If a statistically significant increasing trend is identified in the background data and concurrence from Ohio EPA has been received that the trend is not due to a release of hazardous constituents, then the background period may be based on a moving window. If a background statistical limit greater than an MCL is recalculated to a value below an MCL, the newer, lower limit will be used. If background for a well/parameter indicates a statistical downward trend, background may be truncated to include the newer, lower results and the statistical limit may decrease accordingly.

11.2.4 Statistical Tests

Future inorganic compliance data will be compared to prediction limits that are calculated using the background periods and methods and procedures presented herein. The data will

be evaluated based on the percent of non-detects and the distributional properties of the background data. Historic dissolved arsenic results reported as non-detects at 10 ug/L were excluded from all statistical analyses prior to testing to ensure that potential outliers were not masked or prediction limits artificially inflated by the arsenic results reported at the higher PQL. Detections for dissolved arsenic were not excluded prior to outlier testing. Future organic compliance data will be compared to the PQL, which is considered the statistical limit. A confirmed VOC detection at or above the PQL will be considered an SSEC.

11.2.4.1 Outlier Testing

The statistical parameter data utilized for background purposes were evaluated for the presence of statistical outliers. Outlier testing was conducted using procedures in the Sanitas software based on USEPA guidance and the outlier identification process developed by the Ohio EPA Statistics Workgroup (Division of Drinking and Ground Waters) as documented in Ohio EPA Guidance Document 0715 (DSIWM) dated September 12, 2012. For parameters comprised of less than 75% nondetect background data, the Sanitas software screens each well and parameter for suspected outliers using the USEPA 1989 outlier test using a 0.05 fixed level of significance. Suspected outliers identified by the software using this method are then tested using Dixon's or Rosner's outlier test depending on the total number of background results. Outlier testing is conducted for inorganic parameters using Dixon's outlier test for parameters with 22 results or less or Rosner's outlier test for parameters with greater than 22 results. Outlier testing performed using Dixon's or Rosner's test is performed at the 0.01 level of significance. The Dixon's or Rosner's testing is used only for data sets comprised of less than 75% nondetect data. For any data set comprised of 75% or greater nondetect data, Dixon's/Rosner's outlier tests are not performed. In this instance, the Ohio EPA "Rare Detect" outlier identification procedure for data sets comprised of 75% or greater nondetect data is followed. The following procedures developed by Ohio EPA is used to conduct outlier testing for this facility.

Dixon's/Rosner's Outlier Test

1. The facility will provide a listing of identified outliers based on the results of Dixon's/Rosner's test (for data sets comprised of less than 75% nondetect data) within the statistical program document for the facility, which will be submitted each time background is updated or a new well is added to the program.
2. Based on the results of the outlier test, any outlier identified will either be excluded from background or documentation will be presented within the statistical program that provides justification for retaining the result.

Ohio EPA Rare-Detect Outlier Test

1. The facility will provide a listing of identified outliers based on the results of the Rare-Detect outlier test (for data sets comprised of greater than or equal to 75% nondetect data) within the statistical program document for the facility, which will be submitted each time background is updated or a new well is added to the program.

2. Based on the results of the Rare-Detect outlier test, any outlier identified will either be excluded from background or documentation will be presented within the statistical program with justification for retaining the result.
3. For parameters comprised of greater than or equal to 75% nondetect data, the following procedure developed by Ohio EPA for Rare-Detect parameters will be used:
 - a. When censored data are $\geq 75\%$:
 - i. If there is only a single detection \geq the PQL;
 - a. And detections \geq the MDL are $\geq 50\%$, then any result ≥ 2 times the /current PQL will be identified as a potential outlier.
 - b. And detections \geq the MDL are $< 50\%$, then any result \geq current PQL will be identified as a potential outlier.
 - ii. If there are at least 2 detections \geq the PQL:
 - a. And detections \geq the MDL are $\geq 50\%$, then any result ≥ 3 times the current PQL will be identified as a potential outlier.
 - b. And detections \geq the MDL are less than 50%, then any result ≥ 2 times the current PQL will be identified as a potential outlier.

Table 12 is a summary of the outlier evaluation that provides the results of Dixon's or Rosner's test and an evaluation of detected results above the current PQL for data sets comprised of 75% or greater nondetect data. The results to be excluded as outliers are labeled with a "Yes" on **Table 12** and the results that will not be excluded are labeled with a "No¹". Justification for retaining results labeled with a "No¹" on **Table 12** for parameters with greater than or equal to 75 % nondetect data is based on the result not being identified as an outlier following the Ohio EPA Rare Detect outlier test. All results determined to be outliers in accordance with the outlier testing procedure described above were set as outliers and excluded from the statistical analyses. The outlier testing results from Sanitas are located on the CD provided in **Appendix F**.

11.2.4.2 Trend Testing

After performing outlier testing, statistical trend evaluations were performed on the entire updated or newly established background data set for each parameter at each sample location. Trend evaluations were performed at a 0.01 level of significance (per tail) for each well/parameter using the Sen's Slope/Mann Kendall trend test (see CD in **Appendix F**). The time periods tested for trends are those listed on the summary tables included in Appendix G (Channel Sand Wells) and Appendix H (BTI Wells). Based on the trend testing, there were statistically significant upward trends for barium at BTI well MP-238R and for arsenic at Channel Sand Well MP-406C. Each of the trends is slight and the concentrations are consistent with other wells that monitor the same zone.

11.2.4.3 Distribution

Per OAC Rule 3745-54-97(I)(1), tests of normality will be conducted to assess the distribution of groundwater concentration data to ensure that the statistical method used is appropriate for the distribution. Shapiro-Wilk normality testing will be used with a

Type I error rate of $\alpha = 0.01$. Original or transformed data (via ladder of powers) that are not normally distributed will be analyzed using non-parametric methods. In those instances where the background data are not normally distributed, the following data transformations may be used to construct the prediction limits depending on the data transformation (W statistic) that is determined to be normally distributed: untransformed, $x^{1/2}$, x^2 , $x^{1/3}$, x^3 , $\ln(x)$, x^4 , x^5 , and x^6 . Using the "Ladder of Powers" function, the first data transformation that passes normality testing, starting with untransformed data, is utilized for calculating the parametric prediction limit.

In order to determine the appropriate substitution method for inorganic non-detect results, the proportion of non-detect data within background will be evaluated. The following substitution methods will be used based on the proportion of non-detect results in background:

- If non-detects are ≤ 15 percent, then non-detects will be replaced with one-half the PQL prior to performing the evaluation;
- If non-detects are > 15 percent and ≤ 50 percent, then the data's sample mean and standard deviation will be adjusted according to the Kaplan-Meier technique; and
- If non-detects are > 50 percent, or the background dataset does not follow a normal distribution, a non-parametric prediction limit test will be used.

Normality test results are detailed on the prediction limit summary tables located on the CD in **Appendix F** and the conclusions regarding normality are indicated under the "Method" and "Transform" columns on the prediction limit summary tables. If the data passed the normality test, the summary tables show a parametric prediction limit method was used. If transformations were needed to achieve normal data sets these are listed on the tables. The tables also list cases where non-parametric tests were used because normality testing failed (indicated as "NP Normality"). If greater than 50 percent of the observations are below the PQL, a non-parametric test was used and normality testing was not needed.

Normality results for intra-well statistical evaluations of the Channel Sand and BTI Zones, as well as intra-well prediction limits, are also included in tabular format in **Appendices G** and **H**, respectively. The percentage of non-detects listed on the tables provided in **Appendices G** and **H** were calculated after outliers were removed.

Note that normality tables were not included for upgradient wells since these wells are not required to be statistically evaluated. Since the Upper Sand and 880 Sand wells are being statistically evaluated for VOCs only, normality tables for these wells are not applicable.

11.2.4.4 Prediction Limit

The prediction limit is a statistical method used to compare a single observation to a group of observations. The prediction limit is calculated to include observations from the same population with a specified confidence that is protective of human health and the environment, pursuant to OAC Rule 3745-54-97(I)(4). In groundwater monitoring, a prediction limit approach may be used to make comparisons between background and compliance data. The limit is developed to contain all future observations, within a certain probability. The general equation for a prediction limit is:

$$PL = \bar{x} + Ks$$

where \bar{x} is the sample mean in background, s is the background standard deviation, and K is a multiplier depending on the type of prediction limit under construction. For the Aber Road Facility, intra-well prediction limits have been developed based on a 99% confidence that future observations will fall within the range. Per OAC Rule 3745-54-97(l)(4), prediction limits are based on the number of samples in the background database, data distribution, and the range of concentration values for each constituent. If any future observation exceeds this limit, this is considered statistically significant evidence that the observation is not representative of the background set. Statistical calculations are based on the March 2009 U.S. EPA Unified Guidance.

Prediction limits for each Channel Sand and BTI Well for the eight dissolved metals are listed on the tables included in **Appendices G and H**, respectively.

During parametric prediction limit evaluations, the mean and the standard deviation are calculated for the raw or transformed background data. The number of comparison observations is defined to be included within the lower and upper limits. During nonparametric evaluations, the highest value from the background data is used to set the upper limit of the prediction limit. If background is 100% non-detect, the most current PQL in background will be the prediction limit, and a result equal to or above the PQL will be considered an SSEC.

Included in each statistical analysis report will be a summary of the prediction limits calculated from the background data for each well/parameter. The summary tables define the background sample size, mean, standard deviation, background distribution for each parameter, any transformations applied to specific parameters, and the proportion of non-detects. SSECs will be summarized in a table in the statistical report.

11.2.5 Statistical Power of Evaluation Methods

Under the March 2009 Unified Guidance, the statistical power of the prediction interval is dependent on the frequency of monitoring events, the number of compliance wells in the hydrogeologic unit of interest, the number of constituents being evaluated, the background sample size, and the selected resampling scheme.

The groundwater DMP at the site incorporates constituents that are monitored semiannually. Of the proposed DMP network, there are currently 2 wells statistically evaluated in the Channel Sand and 16 wells statistically evaluated in the BTI with sufficient background data to perform statistical analyses. The wells are statistically evaluated for eight inorganic constituents (dissolved arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver). The DMP will utilize a “1-of-2” verification resampling scheme, as described in Section 11.2.7.

For the Channel Sand zone, using the lowest number of background observations ($n = 8$), 2 downgradient wells, 8 constituents, and a 1 of 2 resampling protocol, parametric intra-well prediction limits provide approximately 75% annual power at three standard deviations and 95% annual power at four standard deviations, while non-parametric intra-well prediction limits provide approximately 80% annual power at three standard deviations and 95% power at four standard deviations. This exceeds the U.S. EPA-recommended power of 55% at three standard deviations and 80% at four standard deviations.

For the BTI zone, using the lowest number of background observations ($n = 8$), 16 downgradient wells, 8 constituents, and a 1 of 2 resampling protocol, non-parametric intra-well prediction limits provide approximately 80% annual power at three standard deviations and 95% annual power at four standard deviations, while parametric intra-well prediction limits provide approximately 20% annual power at three standard deviations and 65% power at four standard deviations. The power curve charts for the non-parametric prediction limits exceed the U.S. EPA-recommended power of 55% at three standard deviations and 80% at four standard deviations. It was not unexpected that the statistical power for intrawell parametric prediction limits for wells and parameters with newly established background periods would be below the U.S. EPA-recommended power of 55% at three standard deviations and 80% at four standard deviations and the SWFPR will be conservatively higher than desired due to the initial number of background samples available at this time. However, statistical power will increase and the SWFPR will decrease once additional background observations are available. The 1-of-2 retesting strategy and limited number of statistically evaluated parameters implemented at the site will assist in reducing the SWFPR.

Statistical power curve graphs demonstrating the above are presented in **Appendix I**. For comparison purposes, U.S. EPA reference power curves are also plotted on the graphs presented in **Appendix I**.

Parametric and non-parametric statistical power curves will be submitted with each background update.

The facility will utilize a site-wide false positive rate (SWFPR) goal of 10% per year, or 5% per monitoring event, as recommended in the March 2009 Unified Guidance, to allow for a balance between the overall cumulative false positive error rate and statistical power.

11.2.6 Volatile Organic Compounds

The statistical limit for VOCs will be set equal to the current PQL for the respective parameter (See **Table 11**). A confirmed VOC detected at or above the PQL will be considered an SSEC. **Table 11** lists the MCLs for each DMP VOC. The PQLs for the DMP VOCs are equal to or below applicable MCLs.

The strategy for determining an SSEC for a VOC in a DMP well will be based on the following procedural steps:

- 1) The laboratory analytical report of the groundwater sample results will undergo a data review. The review will include checking holding times and evaluating QA/QC blanks for the presence of contaminants. A list will be made of VOCs with a detectable concentration in QA/QC samples. Detections for VOCs in groundwater samples that can be clearly attributed to QA/QC issues will be discussed in report submittals but will not be considered SSECs. The site will work to resolve any QA/QC issues before the subsequent sampling event.
- 2) DMP wells with one or more quantifiable VOCs may be resampled in accordance with the verification resampling protocol in Section 11.2.7 to determine a "confirmed presence" of an SSEC. If a resample is not collected or the VOC SSEC is confirmed, a demonstration report may be submitted as allowed per OAC Rule 3745-

54-98(G)(6) or CECOS will proceed into a compliance monitoring program. If the VOC is not confirmed during the resampling event, then the DMP will continue.

11.2.7 Verification Sampling and Notifications for SSECs

A single resample will be used for verification. The “1-of-2” verification resampling protocol (comprising the original sample as “1” and the resample as “2”) is very conservative and yields increased statistical power. If the facility chooses to perform a verification resampling event for an inorganic SSEC or VOC detection indicated by the sample results from the routine semiannual DMP event, it will be performed such that the verification resampling data will be available to report to Ohio EPA within 90 days from the completion of the semiannual event. Verification resampling results will be compared to the calculated statistical limits. If verification resampling indicates that an exceedance did not occur, the DMP will continue. If verification resampling confirms an exceedance, then an SSEC will be declared to the Director of Ohio EPA within seven days of making the SSEC determination. The Director also will be notified of the site’s intent to submit an ASD (if applicable).

As discussed in the March 2009 Unified Guidance, a confirmed SSEC will be declared if any well/constituent pair which was previously 100% non-detect exhibits a result at or above the PQL in consecutive sample and resample results. Per OAC Rule 3745-54-98(G)(1), the Director will be notified about confirmed SSECs within seven days of making the SSEC determination. In the event that an initial sampling result indicates a potential SSEC, the initial result will be declared a confirmed SSEC if CECOS elects not to collect a resample. In practice, the seven-day notification will be presented in the semiannual report due within 90 days of completing the sampling event.

In accordance with OAC Rule 3745-54-98(F)(2), the owner or operator must determine whether there is an SSEC at each DMP well within a reasonable period of time after completion of sampling. The statistical results will be submitted within 90 days from completion of each semiannual groundwater sampling event.

11.3 Response to SSEC

The flow chart provided as **Figure 18** indicates CECOS’ response to an SSEC. In accordance with OAC Rule 3745-54-98(G)(2), within 30 days of the SSEC determination, site-specific Appendix IX sampling will be performed at the well with the SSEC, adjacent monitoring wells in the same zone (intended to characterize the horizontal extent), and wells in vertically adjacent zones (intended to characterize the vertical extent). **Table 13** contains a summary of the DMP Appendix IX sampling system for each downgradient DMP well. A list of current PQLs for Appendix IX parameters is summarized on **Table 14**. The site-specific Appendix IX parameter list includes VOCs listed in the Appendix to OAC Rule 3745-54-98 and other parameters (SVOCs, pesticides, herbicides, PCBs, metals, etc.) taken from Table 1-1 of the approved November 1997 CMI QAPJP. Specific sampling and analysis requirements for the Appendix IX parameters, including minimum container size, preservatives, analytical methods, and method holding times, are outlined in **Table 15**.

The site-specific Appendix IX resampling network was developed by reviewing, for each water-bearing zone, current (2011) potentiometric surface maps of the facility. Historical potentiometric surface maps were also reviewed to establish a historical perspective for groundwater flow.

Groundwater flow patterns were found to be relatively insensitive to the range of seasonal conditions. The potentiometric surface maps indicated that the designated background wells remained upgradient of the site and the downgradient relationship between SCMFs and monitoring wells is generally consistent.

The first column of **Table 13** is a per zone list of monitoring wells that will be sampled as part of the DMP. The other information provided on **Table 13** provides a list of sampling locations that are intended to characterize the extent, in both the horizontal wells (adjacent wells in the same zone) and vertical wells (wells in the same cluster or area set in the next lower zone or, if not part of a cluster, the closest downgradient well in the next lower zone), of any release detected by the DMP. **Table 13** was prepared assuming no groundwater flow occurs through areas where the water bearing zone is absent. There is no zone beneath the BTI; therefore, no wells are listed in the "Next Lower Zone" column on **Table 13** for the BTI wells. Wells listed on **Table 13** are part of the routine DMP sampling network.

If a detection for an Appendix IX parameter occurs above background, the well/constituent may be resampled within 30 days in accordance with OAC Rule 3745-54-98(G)(3). Naturally occurring inorganic parameters such as barium will likely be detected above the PQL during an Appendix IX sampling event. Detected metals will be compared to statistical limits, if applicable. No further action will be required if the detection is below the statistical limit. If an Appendix IX parameter which does not have an established statistical limit is detected above the PQL, background samples may be collected for that well/parameter combination and a background statistical limit may be generated. An ASD may also be submitted for the Appendix IX detection to demonstrate the result was not due to impact from the landfill.

If verification resampling for the detected Appendix IX parameter is conducted and the result does not confirm the detection above background, then an application to amend the Post-Closure Plan will be submitted to make appropriate changes to the DMP or StAP and detection monitoring will continue under OAC Rule 3745-98(G)(6)(d).

If a resample is not collected, the verification resampling result confirms the detection, or a successful ASD is not submitted, then the detection will be declared and, in accordance with OAC Rule 3745-54-98(G)(4), within 90 days of identifying the SSEC(s) per Section 11.2.7 above CECOS will submit a Post-Closure Plan amendment to establish a Compliance Monitoring Program that meets the requirements of OAC Rule 3745-54-99.

Any Appendix IX results and associated Appendix IX verification resampling results will be submitted to the Ohio EPA within 90 days of making the SSEC determination.

If Appendix IX monitoring indicates the SSEC(s) is not related to the units monitored under the DMP, the results will be discussed in an ASD per OAC Rule 3745-54-98(G)(6)(b). In preparation of an ASD, the site may also review other water quality data, including surface water or leachate data, as needed, that are available from any other of

the site's monitoring program that provides relevant data. The ASD will be submitted within 90 days of identifying the SSEC. If the ASD is successful, the DMP will be continued.

Under OAC Rule 3745-54-98(G)(6)(c), once SSEC(s) are declared, and a successful ASD has been made, the DMP will be evaluated and, within 90 days of identifying the SSEC(s), if appropriate, an application for a Post-Closure Plan amendment will be submitted to make changes to the DMP/StAP. If a successful ASD has not been made, in accordance with OAC Rule 3745-54-98(G)(4), within 90 days of identifying a confirmed SSEC(s), an application for a Post-Closure Plan amendment will be submitted to establish a Compliance Monitoring Program under OAC Rule 3745-54-99.

11.3.1 Notification and Additional Response Requirements

If a confirmed SSEC is identified in a DMP well, the following steps will be conducted (See **Figure 18**):

- 1) Notify the director of this finding in writing within seven days of making the SSEC determination (OAC Rule 3745-54-98(G)(1). The notification will be presented with the report due within 90 days of completing the sampling event and must indicate what hazardous constituents have shown an SSEC.
- 2) Unless CECOS submits an ASD that is deemed successful by Ohio EPA, in accordance with Rule 3745-54-98(G)(4), within ninety days of making the SSEC determination, CECOS will submit an application for a Post-Closure Plan amendment to establish a compliance monitoring program meeting the requirements of Rule 3745-54-99 of the Administrative Code. The application will include the following information:
 - a) An identification of the concentration of any constituent detected in the groundwater at each DMP well;
 - b) Any proposed changes to the groundwater monitoring system at the facility necessary to meet the requirements of Rule 3745-54-99 of the Administrative Code;
 - c) Any proposed additions or changes to the monitoring frequency, sampling and analysis procedures or methods, or statistical methods used at the facility necessary to meet the requirements of Rule 3745-54-99 of the Administrative Code; and
 - d) For each hazardous constituent detected at a DMP well, a proposed concentration limit under paragraph (A)(1) or (A)(2) of Rule 3745-54-99 of the Administrative Code, or a notice of intent to seek an alternate concentration limit under paragraph (B) of Rule 3745-54-94 of the Administrative Code.
- 3) Within one hundred eighty days, where applicable, CECOS will then submit to the director:
 - a) All data necessary to justify an alternate concentration limit sought under Rule 3745-54-94 of the Administrative Code; and an engineering feasibility plan for a

- corrective action program necessary to meet the requirement of Rule 3745-54-100 of the Administrative Code, unless:
- (i) All hazardous constituents identified are listed in Table 1 of Rule 3745-54-94 of the Administrative Code and their concentrations do not exceed the respective values given in that table; or
 - (ii) CECOS has sought an alternate concentration limit under paragraph (B) of Rule 3745-54-94 of the Administrative Code for every hazardous constituent identified.
- 4) If CECOS determines that there is an SSEC at a DMP well, it may be demonstrated that a source other than a regulated unit caused the increase or that the detection is an artifact caused by an error in sampling, analysis, or statistical evaluation or natural variation in the groundwater. CECOS may make a demonstration under paragraphs (G) to (G)(6)(d) of Rule 3745-54-98, in addition to, or in lieu of, submitting a Post-Closure Plan alteration request application under paragraph (G)(4) of that rule; In making a demonstration under paragraphs (G) to (G)(6)(d) of Rule 3745-54-98, CECOS will:
- a) Notify the director in writing within seven days of determining an SSEC that the site intends to make a demonstration that the SSEC was not the result of the regulated unit;
 - b) Within ninety days, submit a report to the director which demonstrates that a source other than the regulated unit caused the SSEC or that the contamination resulted from error in sampling, analysis, or evaluation;
 - c) Within ninety days, submit to the director an application for a Post-Closure Plan amendment request to make any appropriate changes to the detection monitoring program at the facility; and
 - d) Continue to monitor in accordance with the detection monitoring program established under this rule.
- 5) In the event of compliance monitoring or corrective action the site may elect to complete surface water sampling for investigational purposes, as required in OAC Rule 3745-54-91.

11.4 Evaluation of Detection Monitoring Results from Background Wells

Upgradient wells will be sampled/analyzed for DMP parameters as part of each semiannual event. In the event that a VOC is detected in an upgradient well, verification resampling will be performed for that well/VOC. The following protocol will be used for confirmed VOC detections at upgradient wells:

- 1) Tier I Appendix IX Sampling: If a VOC is confirmed detected at an upgradient well, that well will be sampled/analyzed for Appendix IX constituents;
- 2) Tier II Appendix IX Sampling: If an Appendix IX constituent (other than the VOC that was already confirmed detected) is detected, Appendix IX sampling will be completed in the same zone and next lower zone (if applicable), as listed on **Table 13**. Note that this may exclude naturally occurring parameters such as trace metals, if the concentrations are within background conditions for the site; and

- 3) If no other Appendix IX parameters are detected at the upgradient well (besides the confirmed VOC), no additional Appendix IX sampling will be required at other wells.
- 4) CECOS will coordinate with Ohio EPA for additional action(s) needed to address confirmed VOC detections at upgradient wells.

12.0 REFERENCES

All of the following references are on-file and available for review at the CECOS facility.

*NPDES Permit No. 1IN00123*AD*, Issued April 27, 2007.

Letter dated February 12, 1997 to Constance Dall, CECOS International, from Thomas Crepeau, Ohio EPA re: *Completion of Closure*.

Corrective Measures Implementation Construction Completion Report, Parsons Engineering, March 1998.

Letter dated August 4, 1998 to Gary Saylor, CECOS International from Kenneth S. Bardo, U.S. EPA Region 5, re: *Approval of CMI CC Report*.

Letter dated April 25, 1996 to Donald Schregardus, Ohio EPA from Constance Dall, CECOS International, re: *Closure Certification Plat and Concentration of Contaminants Remaining In-Situ*.

Letter dated May 3, 1996 to Donald Schregardus, Ohio EPA from Constance Dall, CECOS International, re: *Deed Notification Requiring Director's Signature*.

Deed Restriction for CECOS International recorded by Clermont County Auditor, November 9, 1994.

Approved RCRA Closure Plan, CECOS International, Inc. Aber Road Site. December 1992, September 1993, December 1993, and March 1994.

Approved RCRA Post Closure Plan for Closed Hazardous Waste Disposal Units, CECOS International, Inc. Aber Road Site, December 1992, September 1993, December 1993, and March 1994.

RCRA Closure Report, CECOS International, Inc. Aber Road Site. April 1996.

Letter dated September 23, 1994 to Constance Dall, CECOS International, Inc. from Donald R. Schregardus, Ohio EPA Director, re: *Closure Plan Approval*.

US EPA Adminstrative Order on Consent September 27, 1987.

US EPA Administrative Order on Consent September 30, 1994.

Corrective Measures Implementation (CMI) Operation and Maintenance Manual for the CECOS International, Inc. Aber Road Facility, April and June 2009 (Revision 4).

RCRA Facility Closure Plan CECOS International, Inc. Aber Road Site Appendix E, December 1993.

Spill Prevention, Control & Countermeasure Plan, CECOS International, Inc., December 2010.

Addendum to Groundwater Quality Demonstration Report, April 2010 Monitoring Event, CECOS International, Inc. Aber Road Facility, Herst & Associates, Inc., November 2, 2010.

Frequently Asked Questions Regarding "Lowest PQL" in OAC 3745-27-10(C)(7)(e), Ohio Environmental Protection Agency, April 21, 2008. Accessed on January 24, 2012 on internet via
http://www.epa.state.oh.us/portals/34/document/general/gw_lowest_pql_faqs.pdf.

Proposed Modifications to US EPA Corrective Measures Implementation Quality Assurance Project Plan (CMI QAPP), CECOS International, Inc. Aber Road Facility February 14, 2006.

Letter dated March 10, 2006 to Connie Dall from Kenneth S. Bardo, US EPA re: *QAPP Modification (approval)* CECOS Aber Road Facility.

TABLES

**TABLE 1. CECOS SCMF STANDPIPE, UNDERDRAIN, AND
LEAK DETECTION SUMMARY
CECOS ABER ROAD FACILITY**

SCMF No.	Standpipe No.	Standpipe in Subcell	Underdrains	Leak Detection
3	L-3 L-4 L-5	GEN HM AMP	U-1 U-5 U-2 U-6 U-3 U-7 U-4 U-8	NONE
4/5	L-6 L-7 L-8 L-9	AMP HM GEN GEN	U-9 U-10 U-11 U-12	NONE
6	L-10 L-11 L-12 L-13 L-14	HM HM GEN GEN AMP	U-13 U-14 U-15 U-16	NONE
7	L-15 L-16 L-17 L-18 L-19	HM HM AMP HM GEN	U-17 U-18 U-19 U-20	NONE
8*	L-20 L-21 L-22 L-23 L-24	AMP HM HM GEN GEN	U-21 U-21A U-22 U-22A	NONE
9	L-25 L-26 L-27	GEN HM AMP	U-23 U-24	LD-1 LD-2
10	L-34 L-35 L-36	GEN HM AMP	U-25 U-26	LD-3 LD-4

Notes:

AMP = Amphoteric Subcell

GEN = General Subcell

HM = Heavy Metal Subcell

* L-21 & L-22 are connected. L-23 & L-24 are connected.

**TABLE 2. LEACHATE ACCUMULATION TANKS
CECOS ABER ROAD FACILITY**

Tank Number	Tank Volume (gallons)	Tank Location	Secondary Containment Volume (gallons)	Associated Leachate Standpipe Number for Each Tank
T112	10,000	South of SCMF 6	31,967	L-3, L-4, L-7, L-8, L-9, L-10, L-12, L-13
T111	7,500	South of SCMF 6	31,967	L-5, L-6, L-11, L-14
T110	7,500	South of SCMF 7	16,149	L-16, L-17
T109	7,500	South of SCMF 7	16,149	L-15, L-18, L-19
T108	7,500	West of SCMF 8	9,130	L-20, L-21, L-23
T104	7,500	Between SCMF 9 & 10	14,085	L-25, L-26, L-27
T105	7,500	Between SCMF 9 & 10	14,085	L-34, L-35, L-36

**TABLE 3. SUMMARY OF LEACHATE-RELATED SAMPLING METHODS
CECOS ABER ROAD FACILITY**

F039 WASTEWATER	
Containment Device:	Leachate treatment system tank.
Sampling Technique:	Grab Samples.
Sampling Device:	Through hose directly into sample container.
Number of Aliquots Tanken:	One aliquot.
Comments:	Wear protective gloves, polytyvek, full-face APR with OV/AG cartridges.
References:	SW-846, Section 9.2.
F039 NONWASTEWATER	
Containment Device:	Drum, Roll-off box.
Sampling Technique:	Simple Random Sampling. Composite Samples.
Sampling Device:	Trier, trowel, shovel.
Number of Aliquots Tanken:	Cube-root of number of drums or grid areas.
Comments:	Wear protective gloves, polytyvek, half-face APR with OV/AG cartridges.
References:	SW-846, Section 9.2.

**TABLE 4. ANALYTICAL TEST METHODS - F039 LEACHATE
CECOS ABER ROAD FACILITY**

Constituent	Test Method⁴
Semivolatile Organics	8270D ²
Fluoride	300.0 ¹
Cyanide	335.4 ¹
Arsenic	6010C ²
Barium	6010C ²
Cadmium	6010C ²
Chromium	6010C ²
Lead	6010C ²
Mercury	7470A ²
Selenium	6010C ²
Silver	6010C ²
Phenol	8270D ²
Total Organic Carbon (TOC)	9060A ²
Total Organic Halides (TOX)	9020B ²
Volatile Organic Compounds	8260C ²
Pesticides and PCBs	8081B/8082A ²
2,4-D	8151A ²
2,4,5-TP (Silvex)	8151A ²
Dioxins and Dibenzofurans	8280A ²
TCLP Procedure	1311C ³

Notes:

1. MCAWW = "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020
2. SW-846 = USEPA "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods"
3. OAC 3745-51-24 Appendix.
4. Subject to change with routine method revisions.

**TABLE 5. BOTTOM ELEVATIONS FOR SCMF SUBCELLS,
LEACHATE STANDPIPES, AND STANDPIPE LEACHATE PUMPS
CECOS ABER ROAD FACILITY**

Standpipe Number, SCMF	Elevation of Bottom of Standpipe (fmsl)	Elevation of Bottom of Cell (fmsl)	Elevation of Bottom of Pump (fmsl)
L-3, 3	880	880	880.33
L-4, 3	880	880	880.33
L-5, 3	880	880	880.33
L-6, 4/5	880	880	880.33
L-7, 4/5	880	880	880.33
L-8, 4/5	880	880	880.33
L-9, 4/5	880	880	880.33
L-10, 6	865.6	865.6	865.93
L-11, 6	866	866	866.33
L-12, 6	865.6	865.6	865.93
L-13, 6	866	866	866.33
L-14, 6	878	866	878.33
L-15, 7	866	866	866.33
L-16, 7	866	866	866.33
L-17, 7	866	866	866.33
L-18, 7	866	866	866.33
L-19, 7	866	866	866.33
L-20, 8	871	871	871.33
L-21, 8	867	867	867.33
L-22, 8	870.5	870.5	870.83
L-23, 8	870.5	870.5	870.83
L-24, 8	871	871	871.33
L-25, 9	864.6	865.6	864.93
L-26, 9	864.6	865.6	864.93
L-27, 9	867	868	867.33
L-34, 10	863.6	864.1	863.93
L-35, 10	863.6	864.1	863.93
L-36, 10	863.6	864.1	863.93

Notes:

fmsl = feet above mean sea level

**TABLE 6. LEACHATE TREATMENT SYSTEM
CECOS ABER ROAD FACILITY**

Unit No.	Type of Unit	Capacity	Function
T-101	Aboveground tank	250,000 gal	Temporary storage of leachate from LAPs and Sumps/T1
T-1	Aboveground tank	15,000 gal	Separate oils and solids from untreated leachate
T-2	Aboveground tank	110 gal	Temporary storage of untreated leachate
T-3	Aboveground tank	110 gal	Temporary storage of treated leachate
T-4	Aboveground tank	315 gal	Storage of oil from T-1
T-5	Aboveground tank	917.6 ft ³	Storage of solids from T-1 and M-1
T-6	Aboveground tank	1,500 gal	Product storage
			(93% sulfuric acid)
T-7	Aboveground tank	90 gal	Product storage
			(dilute sulfuric acid)
T-8	Aboveground tank	40 ft ³	Product storage
			(lime)
T-9	Aboveground tank	210 gal	Product storage
			(lime slurry)
T-10	Aboveground tank	90 gal	Product storage
			(anionic polymer)
M-1	Treatment unit	30 gpm	Leachate treatment unit
F-1	Filter press	3 ft ³ (expandable to 5 ft ³)	Dewatering of solids from T-5

Notes:

gal = gallons

ft³ = cubic feet

gpm = gallons per minute

LAPs = Leachate Accumulation Points

**TABLE 7. DETECTION MONITORING PROGRAM WELL NETWORK FOR SAMPLING
CECOS ABER ROAD FACILITY**

Upper Sand								
Well	Date Installed	Original Ground Surface Elevation (fmsl)	TOC Elevation (fmsl)	Measured Total Depth (From Top of Casing) (ft)	Casing Material	Casing Diameter	Northing	Easting
MP-206AR*	11/20/1985	914.7	916.73	29.9	SS	4	6393.92	7996.32
MP-231AR	11/17/1985	913.7	915.73	30.6	SS	4	6069.20	7502.28
MP-235CR	11/19/1985	912.7	914.66	27.9	SS	4	5242.60	6359.09
MP-244ARR	4/28/1989	908.5	909.82	27.8	SS	4	4856.13	5808.87
MP-401A**	8/6/2012	903.8	906.37	18.5	PVC	2	4748.36	5980.28
MP-402A**	8/9/2012	905.9	908.42	21.0	PVC	2	5113.71	6599.53
MP-403A**	8/8/2012	909.7	912.37	18.7	PVC	2	5049.52	7999.42
MP-404A**	8/8/2012	912.6	915.09	20.4	PVC	2	5289.24	7880.46
MP-405A**	8/8/2012	908.5	911.02	15.6	PVC	2	5420.39	8336.47

Notes:

*Upgradient/Background Location; not statistically evaluated. If no asterisk, well is considered downgradient.

**New wells installed in 2012.

Measured total depths as of September 2012. Minor discrepancies may exist between the measured total depths and total depth information from well construction details.

Well information taken from borehole logs and/or well construction details.

**TABLE 7. DETECTION MONITORING PROGRAM WELL NETWORK FOR SAMPLING, CONTINUED
CECOS ABER ROAD FACILITY**

880 Zone Sand								
Well	Date Installed	Original Ground Surface Elevation (fmsl)	TOC Elevation (fmsl)	Measured Total Depth (From Top of Casing) (ft)	Casing Material	Casing Diameter	Northing	Easting
MP-210AR	12/11/1986	910.6	912.83	42.9	SS	4	6263.46	8532.16
MP-211BR	12/12/1986	908.6	911.09	32.9	SS	4	5949.47	8673.12
MP-213A	5/24/1984	908.4	912.98	32.5	PVC	4	5580.39	8401.09
MP-214BR	12/20/1985	908.3	910.29	30.2	SS	4	5056.40	8013.24
MP-228AR	11/17/1985	909.6	911.64	40.3	SS	4	5706.75	6523.84
MP-230A	4/24/1984	906.8	908.75	30.4	PVC	4	5587.58	7039.92
MP-232A	5/2/1984	905.9	909.75	35.7	PVC	4	5327.90	6983.85
MP-233AR	11/18/1985	905.4	907.44	27.7	SS	4	5139.00	6912.53
MP-234AR	11/18/1985	908.9	910.90	24.6	SS	4	5148.38	6631.26
MP-235BR	11/19/1985	912.5	914.50	38.6	SS	4	5241.78	6363.05
MP-250A	11/26/1985	908.2	910.24	40.4	SS	4	4862.93	6041.17
MP-251A	12/5/1985	909.5	911.54	40.4	SS	4	6189.00	8842.87
MP-274A	6/14/1987	909.7	912.78	32.7	SS	4	5345.28	7886.33
MP-277A*	3/17/1989	914.2	915.24	47.3	SS	4	6443.38	7818.00
MP-280A	4/14/1989	907.1	912.28	35.3	SS	4	5442.17	8302.28
MP-401B**	8/3/2012	904.1	906.56	32.0	PVC	2	4749.87	5973.38

Notes:

*Upgradient/Background Location; not statistically evaluated. If no asterisk, well is considered downgradient.

**New wells installed in 2012.

Bold font indicates existing well not in 1994 Post-Closure Plan DMP network.

Measured total depths as of September 2012. Minor discrepancies may exist between the measured total depths and total depth information from well construction details.

Well information taken from borehole logs and/or well construction details.

**TABLE 7. DETECTION MONITORING PROGRAM WELL NETWORK FOR SAMPLING, CONTINUED
CECOS ABER ROAD FACILITY**

Channel Sand								
Well	Date Installed	Original Ground Surface Elevation (fmsl)	TOC Elevation (fmsl)	Measured Total Depth (From Top of Casing) (ft)	Casing Material	Casing Diameter	Northing	Easting
MP-281C	4/11/1989	912.7	914.12	62.8	SS	2	5382.29	7730.60
MP-286C*	4/15/1989	906.1	914.59	57.0	SS	2	6560.20	6980.74
MP-406C**	8/8/2012	914.9	917.40	67.6	PVC	2	5412.90	7571.33

Notes:

*Upgradient/Background Location; not statistically evaluated. If no asterisk, well is considered downgradient.

**New wells installed in 2012.

Measured total depths as of September 2012. Minor discrepancies may exist between the measured total depths and total depth information from well construction details.

Well information taken from borehole logs and/or well construction details.

TABLE 7. DETECTION MONITORING PROGRAM WELL NETWORK FOR SAMPLING, CONTINUED
CECOS ABER ROAD FACILITY

Bedrock-Till Interface (BTI)								
Well	Date Installed	Original Ground Surface Elevation (fmsl)	TOC Elevation (fmsl)	Measured Total Depth (From Top of Casing) (ft)	Casing Material	Casing Diameter	Northing	Easting
MP-227R*	12/8/1986	910.6	913.00	68.7	SS	4	5775.51	6290.33
MP-233R	3/18/1989	905.5	907.00	80.2	SS	2	5119.91	6890.95
MP-234R	11/1/1985	909.9	911.88	75.4	SS	4	5150.48	6623.99
MP-235R	3/28/1989	911.8	914.84	72.2	SS	2	5235.12	6352.97
MP-237	5/9/1984	911.9	913.68	71.1	PVC	2	5306.25	6118.04
MP-238R	11/20/1985	913.3	915.31	61.5	SS	4	5371.48	5876.30
MP-241R	11/26/1985	911.6	913.57	60.4	SS	4	5116.46	5777.01
MP-244R	11/5/1985	907.7	909.73	67.2	SS	4	4850.68	5823.62
MP-250	11/24/1985	908.1	910.07	57.9	SS	4	4863.93	6036.41
MP-274	6/12/1987	909.5	912.20	75.5	SS	4	5344.40	7891.98
MP-279	3/29/1989	909.6	910.36	102.6	SS	2	5701.73	8481.96
MP-280	4/5/1989	907.8	912.49	107.4	SS	2	5428.79	8291.72
MP-281	4/4/1989	911.6	913.53	72.6	SS	2	5386.51	7724.37
MP-404**	8/2/2012	910.2	912.75	101.0	PVC	2	5231.98	8108.08
MP-407**	8/13/2012	907.8	910.31	81.7	PVC	2	5327.14	7044.23
MP-408**	8/17/2012	913.8	916.41	115.0	PVC	2	5431.14	7306.96
MP-409**	8/22/2012	909.3	911.83	81.7	PVC	2	5948.01	8697.78

Notes:

*Upgradient/Background Location; not statistically evaluated. If no asterisk, well is considered downgradient.

**New wells installed in 2012.

Bold font indicates existing well not in 1994 Post-Closure Plan DMP network.

Measured total depths as of September 2012. Minor discrepancies may exist between the measured total depths and total depth information from well construction details.

Well information taken from borehole logs and/or well construction details.

**TABLE 8. WELL SUMMARY TABLE
CECOS ABER ROAD FACILITY**

POTENTIOMETRIC MONITORING NETWORK					
Upper Sand					
MP-203A**	MP-212A**	MP-235AR**	MP-255A**	MP-299B**	MP-404A***
MP-203C**	MP-215A**	MP-235CR*	MP-268**	MP-301B**	MP-405A***
MP-205C**	MP-220AR**	MP-239B**	MP-277B**	MP-303B**	P-505A**
MP-205D**	MP-222B	MP-244ARR*	MP-284B**	MP-401A***	USPZ-1
MP-206AR*	MP-224B	MP-246	MP-285B**	MP-402A***	
MP-207**	MP-231AR*	MP-253A**	MP-290B**	MP-403A***	
880 Sand Zone					
880-PZ1	MP-206**	MP-227AR**	MP-249B**	MP-275**	MP-305A**
880-PZ2	MP-206CR**	MP-228AR*	MP-250A*	MP-276**	MP-306A**
880-PZ3	MP-208**	MP-228B**	MP-251A*	MP-277A*	MP-401B***
880-PZ4	MP-210AR*	MP-229B**	MP-252A**	MP-278A**	P-500B**
880-PZ5	MP-211BR*	MP-230A*	MP-261A**	MP-280A*	P-501A**
M-06**	MP-212D**	MP-232A*	MP-264**	MP-281A**	P-511A**
M-25**	MP-213A*	MP-233AR*	MP-266A**	MP-285A**	P-515A**
MP-200R**	MP-214BR*	MP-234AR*	MP-269A**	MP-289A**	P-517**
MP-201**	MP-216BR**	MP-235BR*	MP-270A**	MP-290A**	P-520**
MP-202	MP-217A**	MP-238AR**	MP-271A**	MP-294A**	P-527**
MP-203R**	MP-217B**	MP-241AR**	MP-272A**	MP-296A**	P-528**
MP-204A**	MP-219A	MP-247A**	MP-273ARR**	MP-300A**	P-529**
MP-205BR**	MP-223AR**	MP-248B	MP-274A*	MP-304A**	
Channel Sand					
12-3A	MP-215BR**	MP-242AR**	MP-282C**	MP-286C*	P-500A**
13-12	MP-231BR**	MP-281C*	MP-283C**	MP-406C***	
BTI					
12-3	MP-222R**	MP-241R*	MP-260**	MP-285**	P-504**
12-4	MP-223R**	MP-242**	MP-265**	MP-287**	P-505**
12-5	MP-226**	MP-243**	MP-266**	MP-290**	P-506**
12-6	MP-227R*	MP-244R*	MP-267**	MP-294**	P-508**
13-5	MP-228R**	MP-248**	MP-269**	MP-296**	P-509**
14-1	MP-230R**	MP-249**	MP-270**	MP-304**	P-510**
14-3	MP-231R**	MP-250*	MP-271**	MP-305**	P-511**
14-4	MP-233R*	MP-251**	MP-272**	MP-404***	P-513**
14-5	MP-234R*	MP-252**	MP-273B**	MP-407***	P-515**
14-7	MP-235R*	MP-253**	MP-274*	MP-408***	
MP-209**	MP-237*	MP-254**	MP-279*	MP-409***	
MP-214R**	MP-238R*	MP-255**	MP-280*	P-500**	
MP-217R**	MP-240R**	MP-256**	MP-281*	P-501**	
MP-221R**	MP-240R1**	MP-259**	MP-284**	P-503**	

Notes:

*: **Well in DMP network.**

** : Potentially viable monitoring point (outside of DMP network) which could be sampled for investigatory purposes, if needed.

***: New wells installed in 2012.

**TABLE 8. WELL SUMMARY TABLE, CONTINUED
CECOS ABER ROAD FACILITY**

OTHER SITE WELLS					
Upper Till					
MP-204C**	MP-206B**				
Lower Till					
12-02A	MP-205AR**	MP-212**	MP-248A**	MP-287A**	
12-05A	MP-210R**	MP-225**	MP-256A**	MP-288A**	
14-03A	MP-211R**	MP-247**	MP-279A**	P-519**	

Notes:

*: **Well in DMP network.**

**: Potentially viable monitoring point (outside of DMP network) which could be sampled for investigatory purposes, if needed.

***: New wells installed in 2012.

**TABLE 9. DMP INDICATOR PARAMETER LIST
CECOS ABER ROAD FACILITY**

Monitoring Zone	Water Quality and Stabilization Parameters*		Statistical Indicator Parameters
Upper Sand	Arsenic, Dissolved	pH (Field)	VOCs listed in Appendix to OAC Rule 3745-54-98 and 9 additional parameters
	Barium, Dissolved	Specific Conductance (Field)	
	Cadmium, Dissolved		
	Chromium, Dissolved	Temperature (Field)	
	Lead, Dissolved	Turbidity (Field)	
	Mercury, Dissolved	ORP (Field)	
	Selenium, Dissolved	Dissolved Oxygen (Field)	
	Silver, Dissolved		
880 Sand	Arsenic, Dissolved	pH (Field)	VOCs listed in Appendix to OAC Rule 3745-54-98 and 9 additional parameters
	Barium, Dissolved	Specific Conductance (Field)	
	Cadmium, Dissolved		
	Chromium, Dissolved	Temperature (Field)	
	Lead, Dissolved	Turbidity (Field)	
	Mercury, Dissolved	ORP (Field)	
	Selenium, Dissolved	Dissolved Oxygen (Field)	
	Silver, Dissolved		
Channel Sand	pH (Field)		VOCs listed in Appendix to OAC Rule 3745-54-98 and 9 additional parameters
	Specific Conductance (Field)		Arsenic, Dissolved
	Temperature (Field)		Barium, Dissolved
	Turbidity (Field)		Cadmium, Dissolved
	ORP (Field)		Chromium, Dissolved
	Dissolved Oxygen (Field)		Lead, Dissolved
			Mercury, Dissolved
			Selenium, Dissolved
			Silver, Dissolved
Bedrock/Till Interface (BTI)	pH (Field)		VOCs listed in Appendix to OAC Rule 3745-54-98 and 9 additional parameters
	Specific Conductance (Field)		Arsenic, Dissolved
	Temperature (Field)		Barium, Dissolved
	Turbidity (Field)		Cadmium, Dissolved
	ORP (Field)		Chromium, Dissolved
	Dissolved Oxygen (Field)		Lead, Dissolved
			Mercury, Dissolved
			Selenium, Dissolved
			Silver, Dissolved

Notes:

*pH, Specific Conductance, and Temperature will be used to confirm stabilization, where applicable.

ORP: Oxidation/Reduction Potential

VOC: Volatile Organic Compound

The 9 additional parameters are typically analyzed as SVOCs but can also be detected using SW-846 Method 8260. These parameters were included after discussions with Ohio EPA.

**TABLE 10. DMP PARAMETERS SAMPLING AND ANALYSIS REQUIREMENTS
CECOS ABER ROAD FACILITY**

Constituent	Container and Preservation⁵	Analytical Method Number⁶	Holding Time
Volatile Organic Compounds (VOCs)	3 G-40 ml, PTFE-lined septum, HCl to pH <2, cool	8260C	14 days
1,2-Dibromo-3-chloropropane (DBCP) and 1,2-Dibromoethane (EDB)	3 G-40 ml, PTFE-lined septum, HCl to pH <2, cool	8011	14 days
Arsenic, Dissolved	1 P-250 ml field filtered, HNO ₃ to pH <2	6020A	6 months
Barium, Dissolved		6010C	
Cadmium, Dissolved		6010C/6020A	
Chromium, Dissolved		6010C	
Lead, Dissolved		6010C/6020A	
Selenium, Dissolved		6010C/6020A	
Silver, Dissolved		6010C/6020A	
Mercury, Dissolved	1 P-250 ml field filtered, HNO ₃ to pH <2	7470A	28 days

Notes:

1. G = Glass, P = Polyethylene, PTFE = Polytetrafluoroethylene (Teflon), HCL = hydrochloric acid, HNO₃ = nitric acid
2. The four-digit method references in Table 10 are from SW-846 and EPA.
3. Pre-preserved containers provided by analytical laboratory.
4. Field parameters (ORP, pH, specific conductance, temperature, and turbidity) are not preserved and measurements are taken immediately.
5. Subject to change based on method revisions and laboratory requirements
6. Subject to change with routine method revisions

**TABLE 11. PQLs FOR ROUTINE DMP PARAMETERS
CECOS ABER ROAD FACILITY**

8260B - VOCs	PQL	Units	MCL
Acetone	10	ug/L	None
Acetonitrile	170	ug/L	None
Acrolein	20	ug/L	None
Acrylonitrile	20	ug/L	None
Allyl chloride; 3-Chloropropene	2	ug/L	None
Benzene	2	ug/L	5
Bromodichloromethane	2	ug/L	80*
Bromoform	2	ug/L	80*
Carbon disulfide	2	ug/L	None
Carbon tetrachloride	2	ug/L	5
Chlorobenzene	2	ug/L	100
Chloroethane; Ethyl chloride	2	ug/L	None
Chloroform	2	ug/L	80*
Chloroprene; 2-Chloro-1,3-butadiene	2	ug/L	None
Dibromochloromethane; Chlorodibromomethane	2	ug/L	80*
trans-1,4-Dichloro-2-butene	5	ug/L	None
Dichlorodifluoromethane	2	ug/L	None
1,1-Dichloroethane	2	ug/L	None
1,2-Dichloroethane	2	ug/L	5
1,1-Dichloroethene	2	ug/L	7
1,2-Dichloroethene (total)	2	ug/L	170**
1,2-Dichloropropane	2	ug/L	5
cis-1,3-Dichloropropene	2	ug/L	None
trans-1,3-Dichloropropene	2	ug/L	None
Ethylbenzene	2	ug/L	700
Ethyl methacrylate	2	ug/L	None
2-Hexanone	10	ug/L	None
Isobutyl alcohol	1000	ug/L	None
Methacrylonitrile	10	ug/L	None
Methyl bromide; Bromomethane	2	ug/L	None
Methyl chloride; Chloromethane	2	ug/L	None
Methylene bromide; Dibromomethane	2	ug/L	None
Methylene chloride; Dichloromethane	2	ug/L	5
Methyl ethyl ketone; 2-Butanone	10	ug/L	None
Methyl iodide; Iodomethane	2	ug/L	None
Methyl methacrylate	10	ug/L	None
4-methyl-2-pentanone; MIBK	10	ug/L	None
Propionitrile	50	ug/L	None
Styrene	2	ug/L	100

Notes:

*: MCL is for Total Trihalomethanes (chloroform, bromodichloromethane, dibromochloromethane, and bromoform)

**: Total 1,2-dichloroethene includes trans-1,2-dichloroethene (MCL = 100 ug/L) and cis-1,2-dichloroethene (70 ug/L)

MCL: National Primary Drinking Water Standards-Maximum Contaminant Levels (MCL)

NA: Not Applicable

VOC: Volatile Organic Compound

TABLE 11. PQLs FOR ROUTINE DMP PARAMETERS, CONTINUED
CECOS ABER ROAD FACILITY

8260B - VOCs (Cont.)	PQL	Units	MCL
1,1,1,2-Tetrachloroethane	2	ug/L	None
1,1,2,2-Tetrachloroethane	2	ug/L	None
Tetrachloroethene	2	ug/L	5
Toluene	2	ug/L	1000
1,1,1-Trichloroethane	2	ug/L	200
1,1,2-Trichloroethane	2	ug/L	5
Trichloroethene	2	ug/L	5
Trichlorofluoromethane	2	ug/L	None
1,2,3-Trichloropropane	2	ug/L	None
Vinyl acetate	10	ug/L	None
Vinyl chloride	1	ug/L	2
Xylenes (Total)	3	ug/L	10000
1,4-Dioxane	40	ug/L	None
Tetrahydrofuran	5	ug/L	None
1,2,4-Trichlorobenzene	1	ug/L	70
1,2-Dichlorobenzene	1	ug/L	600
1,3-Dichlorobenzene	1	ug/L	None
1,4-Dichlorobenzene	1	ug/L	75
Hexachlorobutadiene	1	ug/L	None
Naphthalene	1	ug/L	None
Pentachloroethane	1	ug/L	None
8011 - VOCs	PQL	Units	MCL
1,2-Dibromo-3-chloropropane; DBCP	0.011	ug/L	0.2
1,2-Dibromoethane; Ethylene dibromide	0.011	ug/L	0.05
6010B - Metals	PQL	Units	MCL
Barium, Dissolved	0.002	mg/L	2
Cadmium, Dissolved	0.001	mg/L	0.005
Chromium, Dissolved	0.005	mg/L	0.1
Lead, Dissolved	0.005	mg/L	0.015
Selenium, Dissolved	0.015	mg/L	0.05
Silver, Dissolved	0.003	mg/L	0.10***
6020 - Metals	PQL	Units	
Arsenic, Dissolved	0.001	mg/L	0.01
7470A - Metals	PQL	Units	
Mercury, Dissolved	0.0002	mg/L	0.002
Field Parameters	PQL	Units	
Dissolved Oxygen (DO)	N/A	mg/L	None
Oxidation/Reduction Potential (ORP)	NA	mv	None
pH	NA	su	6.5 - 8.5***
Specific Conductance	NA	umhos/cm	None
Temperature	NA	Deg-C	None
Turbidity	NA	NTU	None

Notes:

***: These parameters have established National Secondary Drinking Water Standards

MCL: National Primary Drinking Water Standards-Maximum Contaminant Levels (MCL)

NA: Not Applicable

VOC: Volatile Organic Compound

**TABLE 12. OUTLIER EVALUATION SUMMARY
ABER ROAD FACILITY**

Well No.	Parameters	Date Range Tested	Outliers Identified by Dixons Test	Detections Identified for >75% ND data sets	Date	Result to be Excluded Yes / No
MP-233R	Chromium, Dissolved	10/97 - 7/14	--	0.007794 mg/L	4/98	No ¹
			--	0.00957 mg/L	10/98	No ¹
			--	0.0117 mg/L	4/99	Yes
MP-234R	Chromium, Dissolved	10/97 - 7/14	--	0.0107 mg/L	10/98	Yes
			--	0.00572 mg/L	4/99	No ¹
MP-235R	Arsenic, Dissolved	10/97 - 7/14	0.0144 mg/L	--	10/03	Yes
	Chromium, Dissolved	10/97 - 7/14	--	0.00702 mg/L	10/98	No ¹
			--	0.00751 mg/L	10/00	No ¹
MP-238R	Chromium, Dissolved	10/97 - 7/14	--	0.005204 mg/L	4/98	Yes
MP-241R	Chromium, Dissolved	10/97 - 7/14	--	0.006653 mg/L	4/98	Yes
MP-244R	Chromium, Dissolved	10/97 - 7/14	--	0.0071 mg/L	10/98	No ¹
			--	0.0118 mg/L	4/99	Yes
MP-250	Arsenic, Dissolved	10/97 - 7/14	0.0315 mg/L	--	10/97	Yes
	Chromium, Dissolved	10/97 - 7/14	--	0.0102 mg/L	4/98	Yes
			--	0.0134 mg/L	10/01	Yes
MP-274	Arsenic, Dissolved	10/97 - 7/14	0.015 mg/L	--	10/03	Yes
	Chromium, Dissolved	10/97 - 7/14	--	0.007753 mg/L	4/98	No ¹
			--	0.00569 mg/L	4/99	No ¹
MP-279	Arsenic, Dissolved	10/97 - 7/14	0.235 mg/L	--	4/01	Yes
	Chromium, Dissolved	10/97 - 7/14	--	0.01008 mg/L	4/98	Yes
			--	0.0358 mg/L	10/98	Yes
			--	0.0523 mg/L	4/99	Yes
MP-280	Arsenic, Dissolved	10/97 - 7/14	0.0412 mg/L	--	10/03	Yes
			0.01 mg/L	--	10/07	Yes
			0.0093 mg/L	--	4/12	Yes
	Chromium, Dissolved	10/97 - 7/14	--	0.008372 mg/L	4/98	No ¹
			--	0.0052 mg/L	10/06	No ¹
MP-281	Arsenic, Dissolved	10/97 - 7/14	0.0117 mg/L	--	10/03	Yes
	Chromium, Dissolved	10/97 - 7/14	--	0.007088 mg/L	4/98	No ¹
			--	0.0054 mg/L	10/6/98	No ¹
			--	0.03093 mg/L	10/15/98	Yes
MP-281C	Arsenic, Dissolved	10/97 - 7/14	0.0167 mg/L	--	10/03	Yes
	Chromium, Dissolved	10/97 - 7/14	--	0.006565 mg/L	4/98	Yes

¹ Result retained as permitted in accordance with OEPA outlier evaluation criteria.

**TABLE 13. DMP APPENDIX IX SAMPLING SYSTEM
CECOS ABER ROAD FACILITY**

Zone	Well ID	DMP Appendix IX Network	DMP Appendix IX Network
		Same Zone - Adjacent or Downgradient Well(s)	Next Lower Zone
Upper Sand	MP-206AR-Tier I*	MP-206AR	
	MP-206AR-Tier II*	MP-231AR	MP-277A (880)
	MP-231AR	MP-231AR, MP-405A	MP-406C (CS)
	MP-235CR	MP-235CR, MP-402A, MP-401A	MP-235BR (880)
	MP-244ARR	MP-244ARR, MP-401A	MP-401B (880)
	MP-401A	MP-401A, MP-244ARR	MP-401B (880)
	MP-402A	MP-402A, MP-235CR	MP-234AR (880)
	MP-403A	MP-403A, MP-404A	MP-214BR (880)
	MP-404A	MP-404A, MP-405A, MP-403A	MP-214BR (880)
	MP-405A	MP-405A, MP-404A	MP-280A (880)
880 Sand	MP-210AR	MP-210AR, MP-251A	MP-409 (BTI)
	MP-211BR	MP-211BR, MP-213A, MP-251A	MP-409 (BTI)
	MP-213A	MP-213A, MP-211BR, MP-280A	MP-280 (BTI)
	MP-214BR	MP-214BR, MP-274A, MP-280A	MP-404 (BTI)
	MP-228AR	MP-228AR, MP-230A	MP-407 (BTI)
	MP-230A	MP-230A, MP-228AR, MP-232A	MP-407 (BTI)
	MP-232A	MP-232A, MP-230A, MP-233AR	MP-407 (BTI)
	MP-233AR	MP-233AR, MP-232A, MP-234AR	MP-233R (BTI)
	MP-234AR	MP-234AR, MP-233AR, MP-235BR	MP-234R (BTI)
	MP-235BR	MP-235BR, MP-234AR, MP-250A	MP-235R (BTI)
	MP-250A	MP-250A, MP-401B	MP-250 (BTI)
	MP-251A	MP-251A, MP-210AR, MP-211BR	MP-409 (BTI)
	MP-274A	MP-274A, MP-214BR	MP-281C (CS)
	MP-277A-Tier I*	MP-277A	
	MP-277A-Tier II*	MP-210AR	MP-281 (BTI)
	MP-280A	MP-280A, MP-213A, MP-214BR	MP-280 (BTI)
	MP-401B	MP-401B, MP-250A	MP-250 (BTI)

TABLE 13. DMP APPENDIX IX SAMPLING SYSTEM, CONTINUED
CECOS ABER ROAD FACILITY

Zone	Well ID	DMP Appendix IX Network	DMP Appendix IX Network
		Same Zone - Adjacent or Downgradient Well(s)	Next Lower Zone
Channel Sand	MP-281C	MP-281C, MP-406C	MP-281 (BTI)
	MP-286C-Tier I*	MP-286C	
	MP-286C-Tier II*	MP-281C, MP-406C	MP-281 (BTI)
	MP-406C	MP-406C, MP-281C	MP-281 (BTI)
Bedrock/Till Interface (BTI)	MP-227R-Tier I*	MP-227R	
	MP-227R-Tier II*	MP-235R	
	MP-233R	MP-233R, MP-234R, MP-407	
	MP-234R	MP-234R, MP-233R, MP-235R	
	MP-235R	MP-235R, MP-234R, MP-237	
	MP-237	MP-237, MP-235R, MP-238R, MP-250	
	MP-238R	MP-238R, MP-237, MP-241R, MP-250	
	MP-241R	MP-241R, MP-244R, MP-250	
	MP-244R	MP-244R, MP-250	
	MP-250	MP-250, MP-244R	
	MP-274	MP-274, MP-281, MP-404	
	MP-279	MP-279, MP-409, MP-280	
	MP-280	MP-280, MP-279, MP-404	
	MP-281	MP-281, MP-274, MP-408	
	MP-404	MP-404, MP-280, MP-274	
	MP-407	MP-407, MP-233R, MP-408	
	MP-408	MP-408, MP-407, MP-281	
	MP-409	MP-409, MP-279	

Notes:

When a volatile organic compound (VOC) is confirmed in an upgradient well, a two-tiered approach will be used for Appendix IX sampling.

Tier I includes Appendix IX sampling at the upgradient well exhibiting the confirmed VOC. If an Appendix IX constituent (other than the VOC that was already confirmed detected) is detected, Tier II Appendix IX sampling will be completed in the same zone and next lower zone (if applicable).

This table was prepared assuming that no ground water flow occurs through areas where the water bearing zone is absent.

"Same Zone" and "Next Lower Zone" wells chosen through professional judgment and discussions with Ohio EPA.

TABLE 14. PQLs FOR APPENDIX IX PARAMETERS
CECOS ABER ROAD FACILITY

8260B - VOCs	PQL	Units	8260B - VOCs (Cont.)	PQL	Units
Acetone	10	ug/L	Toluene	2	ug/L
Acetonitrile	170	ug/L	1,1,1-Trichloroethane	2	ug/L
Acrolein	20	ug/L	1,1,2-Trichloroethane	2	ug/L
Acrylonitrile	20	ug/L	Trichloroethene	2	ug/L
Allyl chloride; 3-Chloropropene	2	ug/L	Trichlorofluoromethane	2	ug/L
Benzene	2	ug/L	1,2,3-Trichloropropane	2	ug/L
Bromodichloromethane	2	ug/L	Vinyl acetate	10	ug/L
Bromoform	2	ug/L	Vinyl chloride	1	ug/L
Carbon disulfide	2	ug/L	Xylenes (Total)	3	ug/L
Carbon tetrachloride	2	ug/L	8011 VOCs	PQL	Units
Chlorobenzene	2	ug/L	1,2-Dibromo-3-chloropropane; DBCP	0.011	ug/L
Chloroethane; Ethyl chloride	2	ug/L	1,2-Dibromoethane; Ethylene dibromide	0.011	ug/L
Chloroform	2	ug/L	8270C - SVOCs	PQL	Units
Chloroprene; 2-Chloro-1,3-butadiene	2	ug/L	Acenaphthene	10	ug/L
Dibromochloromethane; Chlorodibromomethane	2	ug/L	Acenaphthylene	10	ug/L
trans-1,4-Dichloro-2-butene	5	ug/L	Acetophenone	10	ug/L
Dichlorodifluoromethane	2	ug/L	2-Acetylaminofluorene	20	ug/L
1,1-Dichloroethane	2	ug/L	4-Aminobiphenyl	10	ug/L
1,2-Dichloroethane	2	ug/L	Aniline	10	ug/L
1,1-Dichloroethene	2	ug/L	Anthracene	10	ug/L
trans-1,2-Dichloroethene	2	ug/L	Aramite	20	ug/L
1,2-Dichloropropane	2	ug/L	Benzo[a]anthracene	10	ug/L
cis-1,3-Dichloropropene	2	ug/L	Benzo[b]fluoranthene	10	ug/L
trans-1,3-Dichloropropene	2	ug/L	Benzo[k]fluoranthene	10	ug/L
Ethylbenzene	2	ug/L	Benzo[g,h,i]perylene	10	ug/L
Ethyl methacrylate	2	ug/L	Benzyl alcohol	20	ug/L
2-Hexanone	10	ug/L	Bis(2-chloroethoxy)methane	10	ug/L
Isobutyl alcohol	1000	ug/L	Bis(2-chloroethyl)ether	10	ug/L
Methacrylonitrile	10	ug/L	Bis(2-chloro-1-methylethyl)ether; 2,2-oxybis[1-chloropropane]	10	ug/L
Methyl bromide; Bromomethane	2	ug/L	Bis(2-ethylhexyl)phthalate	5	ug/L
Methyl chloride; Chloromethane	2	ug/L	4-Bromophenyl phenyl ether	10	ug/L
Methylene bromide; Dibromomethane	2	ug/L	Butyl benzyl phthalate	10	ug/L
Methylene chloride; Dichloromethane	2	ug/L	4-Chloroaniline; p-Chloroaniline	10	ug/L
Methyl ethyl ketone; 2-Butanone	10	ug/L	Chlorobenzilate	50	ug/L
Methyl iodide; Iodomethane	2	ug/L	4-Chloro-m-cresol; p-Chloro-3-methylphenol	10	ug/L
Methyl methacrylate	10	ug/L	2-Chloronaphthalene	10	ug/L
4-methyl-2-pentanone; MIBK	10	ug/L	2-Chlorophenol	10	ug/L
Propionitrile	50	ug/L	4-Chlorophenyl phenyl ether	10	ug/L
Styrene	2	ug/L	Chrysene	10	ug/L
1,1,1,2-Tetrachloroethane	2	ug/L	m&p-Cresol; 3&4-Methylphenol	20	ug/L
1,1,2,2-Tetrachloroethane	2	ug/L	o-Cresol; 2-Methylphenol	10	ug/L
Tetrachloroethene	2	ug/L	Diallate	10	ug/L

TABLE 14. PQLs FOR APPENDIX IX PARAMETERS, CONTINUED
CECOS ABER ROAD FACILITY

8270C SVOCs (Cont.)	PQL	Units	8270C SVOCs (Cont.)	PQL	Units
Dibenz[a,h]anthracene	10	ug/L	Methyl methanesulfonate	10	ug/L
Dibenzofuran	10	ug/L	2-methylnaphthalene	10	ug/L
Di-n-butyl phthalate	10	ug/L	Naphthalene	10	ug/L
1,2-Dichlorobenzene	10	ug/L	1,4-Naphthoquinone	50	ug/L
1,3-Dichlorobenzene	10	ug/L	1-Naphthylamine	10	ug/L
1,4-Dichlorobenzene	10	ug/L	2-Naphthylamine	10	ug/L
3,3'-Dichlorobenzidine	20	ug/L	2-Nitroaniline; o-Nitroaniline	50	ug/L
2,4-Dichlorophenol	10	ug/L	3-Nitroaniline; m-Nitroaniline	50	ug/L
2,6-Dichlorophenol	10	ug/L	4-Nitroaniline; p-Nitroaniline	50	ug/L
Diethyl phthalate	10	ug/L	Nitrobenzene	10	ug/L
Dimethoate	10	ug/L	2-Nitrophenol; o-nitrophenol	10	ug/L
p-(Dimethylamino)azobenzene	50	ug/L	4-Nitrophenol; p-Nitrophenol	50	ug/L
7,12-Dimethylbenz[a]anthracene	10	ug/L	4-Nitroquinoline-1-oxide	40	ug/L
3,3-Dimethylbenzidine	50	ug/L	N-Nitrosodi-n-butylamine	10	ug/L
a,a-Dimethylphenethylamine; Phentermine	100	ug/L	N-Nitrosodiethylamine	10	ug/L
2,4-Dimethylphenol	10	ug/L	n-Nitrosodimethylamine	50	ug/L
Dimethyl phthalate	10	ug/L	N-Nitrosodiphenylamine	10	ug/L
1,3-Dinitrobenzene	20	ug/L	N-Nitrosodi-n-propylamine	10	ug/L
4,6-Dinitro-o-cresol; 4,6-Dinitro-2-methylphenol	50	ug/L	N-Nitrosomethylethylamine	10	ug/L
2,4-Dinitrophenol	50	ug/L	N-Nitrosomorpholine	10	ug/L
2,4-Dinitrotoluene	10	ug/L	N-Nitrosopiperidine	10	ug/L
2,6-Dinitrotoluene	10	ug/L	N-Nitrosopyrrolidine	10	ug/L
Dinoseb; 2-sec-Butyl-4,6-dinitrophenol	10	ug/L	5-Nitro-o-toluidine	10	ug/L
Di-n-octyl-phthalate	10	ug/L	Pentachlorobenzene	10	ug/L
1,4-Dioxane	1000	ug/L	Pentachloroethane	10	ug/L
Diphenylamine	50	ug/L	Pentachloronitrobenzene	10	ug/L
Ethyl methanesulfonate	10	ug/L	Phenacetin	50	ug/L
Fluoranthene	10	ug/L	Phenanthrene	10	ug/L
Fluorene	10	ug/L	Phenol	10	ug/L
Hexachlorobenzene	5	ug/L	p-Phenylenediamine	800	ug/L
Hexachlorobutadiene	10	ug/L	2-Picoline	80	ug/L
Hexachlorocyclopentadiene	5	ug/L	Pronamide	10	ug/L
Hexachloroethane	300	ug/L	Pyrene	10	ug/L
Hexachlorophene	310	ug/L	Pyridine	50	ug/L
Hexachloropropene	10	ug/L	Safrole	10	ug/L
Indeno[1,2,3-cd]pyrene	10	ug/L	1,2,4,5-Tetrachlorobenzene	20	ug/L
Isodrin	10	ug/L	2,3,4,6-Tetrachlorophenol	10	ug/L
Isophorone	10	ug/L	o-Toluidine	20	ug/L
Isosafrole	10	ug/L	1,2,4-Trichlorobenzene	10	ug/L
Kepone	50	ug/L	2,4,5-Trichlorophenol	10	ug/L
Methapyrilene	50	ug/L	2,4,6-Trichlorophenol	10	ug/L
3-Methylcholanthrene	10	ug/L	1,3,5-Trinitrobenzene; sym-Trinitrobenzene	50	ug/L

TABLE 14. PQLs FOR APPENDIX IX PARAMETERS, CONTINUED
CECOS ABER ROAD FACILITY

8270C - SVOCs - Low Level	PQL	Units	8151A - Herbicides	PQL	Units
Benzo(a)pyrene	0.18	ug/L	2,4,5-T; 2,4,5-Trichlorophenoxyacetic acid	0.5	ug/L
Pentachlorophenol	1	ug/L	Silvex; 2,4,5-TP	0.5	ug/L
8081A - Organochlorine Pesticides	PQL	Units	2,4-D; 2,4-Dichlorophenoxyacetic acid	1.3	ug/L
Aldrin	0.05	ug/L	6010B - Metals	PQL	Units
alpha-BHC	0.05	ug/L	Barium, Dissolved	0.002	mg/L
beta-BHC	0.05	ug/L	Beryllium, Dissolved	0.002	mg/L
delta-BHC	0.05	ug/L	Cadmium, Dissolved	0.001	mg/L
gamma-BHC; Lindane	0.05	ug/L	Chromium, Dissolved	0.005	mg/L
Technical Chlordane	0.5	ug/L	Cobalt, Dissolved	0.004	mg/L
4,4'-DDD	0.05	ug/L	Copper, Dissolved	0.01	mg/L
4,4'-DDE	0.05	ug/L	Lead, Dissolved	0.005	mg/L
4,4'-DDT	0.05	ug/L	Nickel, Dissolved	0.01	mg/L
Dieldrin	0.05	ug/L	Selenium, Dissolved	0.015	mg/L
Endosulfan I	0.05	ug/L	Silver, Dissolved	0.003	mg/L
Endosulfan II	0.05	ug/L	Tin, Dissolved	0.01	mg/L
Endosulfan sulfate	0.05	ug/L	Vanadium, Dissolved	0.005	mg/L
Endrin	0.05	ug/L	Zinc, Dissolved	0.01	mg/L
Endrin aldehyde	0.05	ug/L	6020 - Metals	PQL	Units
Heptachlor	0.05	ug/L	Antimony, Dissolved	0.001	mg/L
Heptachlor epoxide	0.05	ug/L	Arsenic, Dissolved	0.001	mg/L
Methoxychlor	0.05	ug/L	Thallium, Dissolved	0.0002	mg/L
Toxaphene	0.5	ug/L	7470A - Mercury	PQL	Units
8082 - PCBs	PQL	Units	Mercury, Dissolved	0.0002	mg/L
PCB-1016	0.5	ug/L	9012A - Cyanide	PQL	Units
PCB-1221	0.5	ug/L	Cyanide, Total	0.01	mg/L
PCB-1232	0.5	ug/L	SM 4500 S2 D - Sulfide	PQL	Units
PCB-1242	0.5	ug/L	Sulfide, Total	0.1	mg/L
PCB-1248	0.5	ug/L	Field Parameters	PQL	Units
PCB-1254	0.5	ug/L	pH	N/A	SU
PCB-1260	0.5	ug/L	Specific conductance	N/A	umhos/cm
8141A - Organophosphorous Pesticides	PQL	Units	Temperature	N/A	Degrees C
Disulfoton	1	ug/L	Turbidity	N/A	NTU
Famphur	1	ug/L	Oxidation-Reduction Potential (ORP)	N/A	mv
Methyl parathion	1	ug/L	Dissolved Oxygen (DO)	N/A	mg/L
Parathion	1	ug/L			
Phorate	1	ug/L			
Tetraethyl dithiopyrophosphate; Sulfotepp	1	ug/L			
O,O-Diethyl O-2-pyrazinyl phosphorothioate; Thionazin	1	ug/L			

Notes:

PCB = Polychlorinated Biphenyls; SVOC = Semi-Volatile Organic Compound; VOC = Volatile Organic Compound

PQL = Practical Quantitation Limit

PQLs were generally taken from the approved 1997 Corrective Measures Implementation - Quality Assurance Project Plan (QAPjP). PQLs above established National Primary Drinking Water Standards-Maximum Contaminant Levels (MCLs) were lowered below the PQL, if possible. Hexachlorobenzene and Dinoseb PQLs are above their MCLs and Pentachlorophenol and PCB PQLs are at their MCLs since these are the lowest routinely achievable concentrations by the analytical laboratory. In a few instances laboratory PQLs were above QAPjP PQLs. In these cases, PQLs were updated to meet current laboratory PQLs. PQLs may change based on laboratory analytical studies, dilutions, etc.

Field parameters are not Appendix IX constituents but will be collected for information purposes during Appendix IX sampling event

**TABLE 15. APPENDIX IX PARAMETERS SAMPLING AND ANALYSIS REQUIREMENTS
CECOS ABER ROAD FACILITY**

Constituent	Container and Preservation⁴	Analytical Method Number⁵	Holding Time
Volatile Organic Compounds (VOCs)	3 G-40 ml, PTFE-lined septum, HCl to pH <2, cool	8260C	14 days
1,2-Dibromo-3-chloropropane (DBCP) and 1,2-Dibromoethane (EDB)	3 G-40 ml, PTFE-lined septum, HCl to pH <2, cool	8011	14 days
Semi-Volatile Organic Compounds (SVOCs)	2 G-250 ml, PTFE-lined lid, cool	8270D	7 days to extraction, 40 days for analysis
Organochlorine Pesticides	2 G-250 ml, PTFE-lined lid, cool	8081B	7 days to extraction, 40 days for analysis
Polychlorinated Biphenyls (PCBs)	2 G-250 ml, PTFE-lined lid, cool	8082A	7 days to extraction, 40 days for analysis
Organophosphorus Pesticides	2 G-250 ml, PTFE-lined lid, cool	8141A	7 days to extraction, 40 days for analysis
Herbicides	2 G-1000 ml, PTFE-lined lid, cool	8151A	7 days to extraction, 40 days for analysis
Antimony, Dissolved	1 P-250 ml field filtered, HNO ₃ to pH <2	6020A	6 months
Arsenic, Dissolved		6020A	
Barium, Dissolved		6010C	
Beryllium, Dissolved		6010C	
Cadmium, Dissolved		6010C/6020A	
Chromium, Dissolved		6010C	
Cobalt, Dissolved		6010C	
Copper, Dissolved		6010C	
Lead, Dissolved		6010C/6020A	
Nickel, Dissolved		6010C	
Selenium, Dissolved		6010C/6020A	

**TABLE 15. APPENDIX IX PARAMETERS SAMPLING AND ANALYSIS REQUIREMENTS, CONTINUED
CECOS ABER ROAD FACILITY**

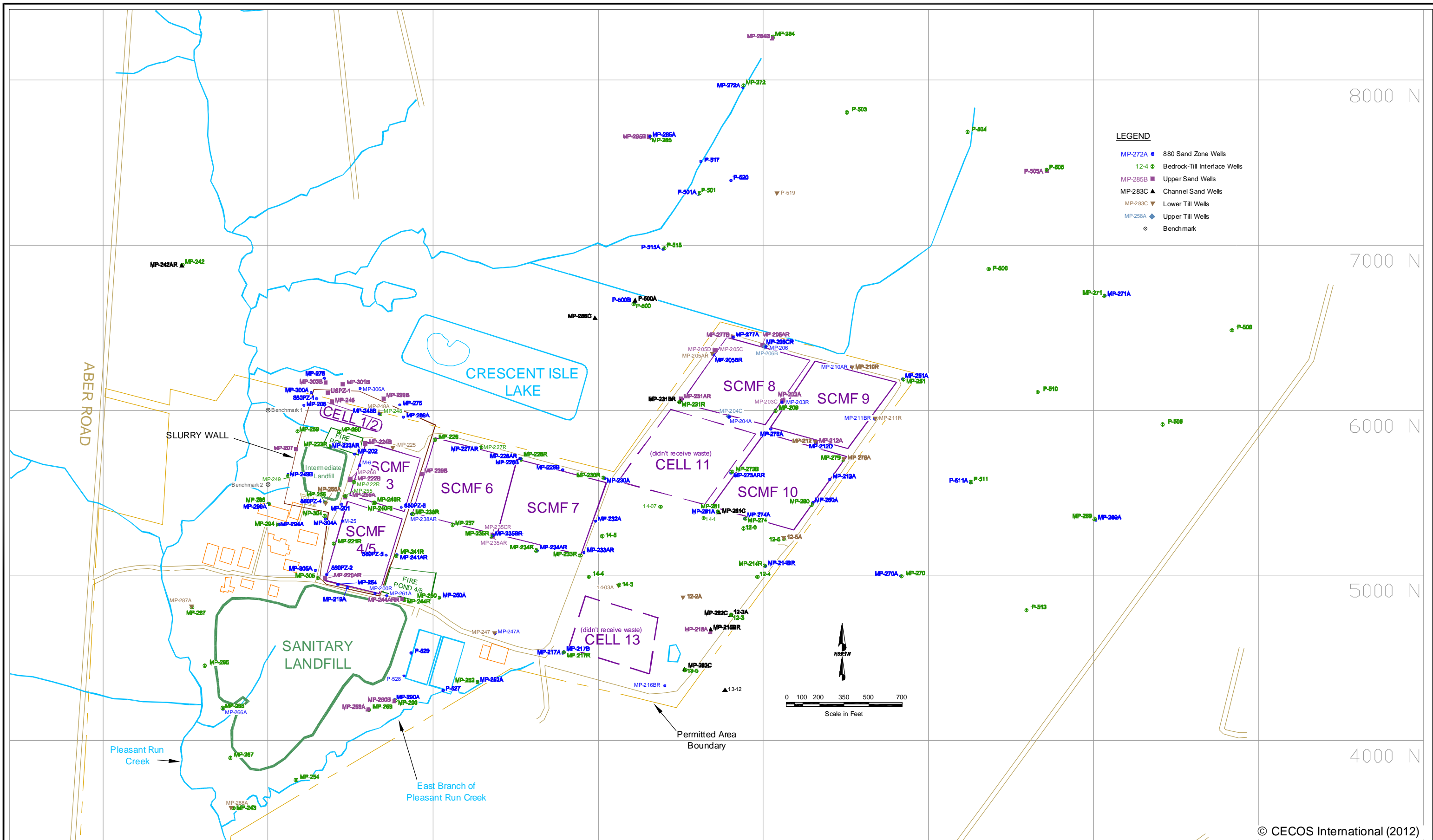
Constituent	Container and Preservation	Analytical Method Number ⁵	Holding Time
Silver, Dissolved	1P-250 ml field filtered, HNO ₃ to pH <2	6010C/6020A	6 months
Thallium, Dissolved		6010C	
Tin, Dissolved		6010C	
Vanadium, Dissolved		6010C	
Zinc, Dissolved		6010C	
Mercury, Dissolved	1 P-250 ml field filtered, HNO ₃ to pH <2	7470A	28 days
Cyanide, Total	1P-250 ml, NaOH, cool	9012B	14 days
Sulfide, Total	1 P-250 ml, Zinc Acetate & NaOH, cool	SM 4500 S2 D	7 days

Notes:

G = Glass, P = Polyethylene, PTFE = Polytetrafluoroethylene (Teflon), HCL = hydrochloric acid, HNO₃ = nitric acid, NaOH = sodium hydroxide

1. The four-digit method references in Table 15 are from SW-846 and EPA.
2. Pre-preserved containers provided by analytical laboratory.
3. Field parameters (ORP, pH, specific conductance, temperature, and turbidity) are not preserved and measurements are taken immediately.
4. Subject to change based on method revisions and laboratory requirements
5. Subject to change with routine method revisions.

FIGURES



ABER ROAD

SLURRY WALL

CRESCENT ISLE LAKE

SANITARY LANDFILL

Pleasant Run Creek

East Branch of Pleasant Run Creek

(didn't receive waste)

(didn't receive waste)

Permitted Area Boundary

LEGEND

- MP-272A ● 880 Sand Zone Wells
- 12-4 ⚡ Bedrock-Till Interface Wells
- MP-285B ■ Upper Sand Wells
- MP-283C ▲ Channel Sand Wells
- MP-283C ▼ Lower Till Wells
- MP-258A ◆ Upper Till Wells
- ⊗ Benchmark

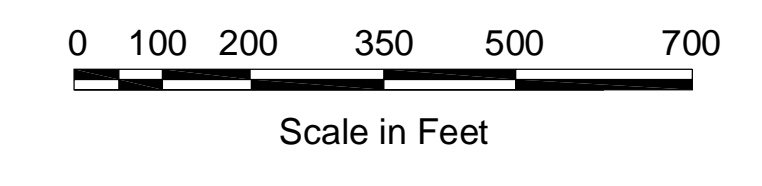
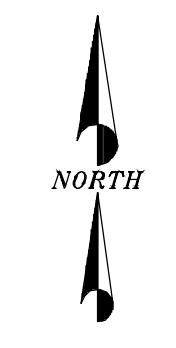
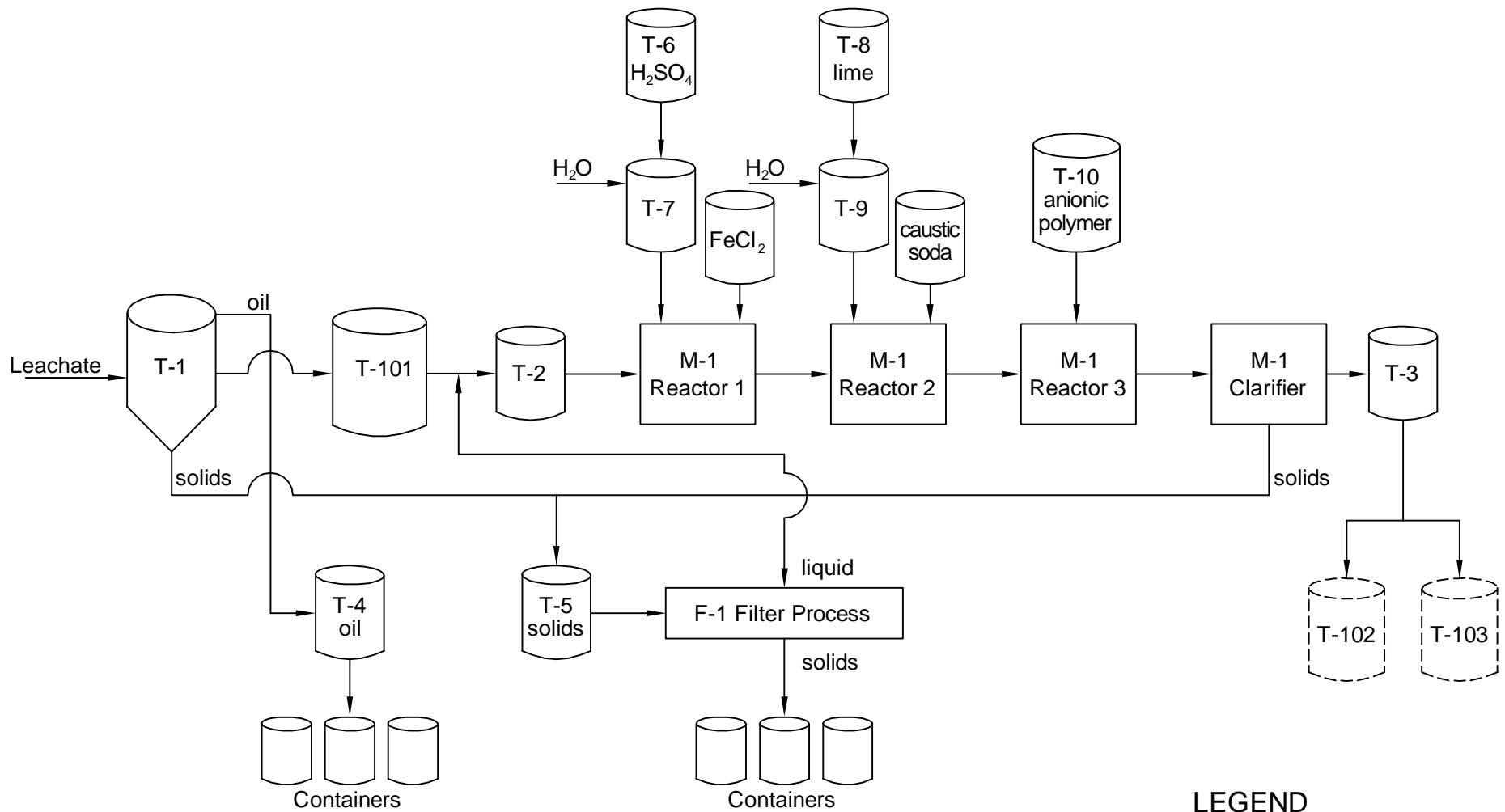


Figure 1
Site Well Location Map

Aber Road Facility
Williamsburg, Ohio

© CECOS International (2012)





LEGEND

----- Not part of the treatment system, generator-status tanks

© CECOS International (2012)



4631 North St. Peters Parkway
St. Charles, Missouri 63304
Phone (636) 939-9111
Fax (636) 939-9757

HERST & ASSOCIATES, INC.®

Aber Road Facility
Williamsburg, Ohio

Figure 3
Process Flow Diagram for the
Leachate Treatment System

Page

REMEDIAL ACTION FORM (RAF) LOG

[illegible]

Figure 5. Example Remedial Action Form Log Page

**CECOS INTERNATIONAL, INC.
ABER ROAD FACILITY
DAILY INSPECTION CHECKLIST**

January 2012
Revised October 2012

Rainfall: _____
Weather: _____
Temperature: _____
Wind: _____

Begin: Inspection Date _____
Inspection Time _____

End: Inspection Date _____
Inspection Time _____

Inspection Criteria	Problems		RAF Prepared		Comments
	Yes	No	Yes	No	
A. TRUCK WASH FACILITY					
1. Drain Trench when in use					
a. Liquids present (freeboard < 2 feet)					
b. Solids present					
2. Area Surrounding Drain Trench and General Area when in use					
a. Obvious signs of leakage					
b. Spills					
c. Solids present					
3. High Level Alarm (Overfill Control Equipment) Operational when in use					
4. Secondary Containment Area when in use					
a. Presence of Liquids (Alarm Sounding)					
b. Alarm non-operational					
B. CONTAMINATED WATER STORAGE TANKS (T102 - T103)					
1. Monitoring Equipment					T-102 _____
a. Pressure Gauge Reading					T-103 _____
b. Temperature Gauge Reading					T-102 _____
					T-103 _____
2. Level of Liquid in Tanks					T-102 _____
a. Tank Indicators and Overfill Control Equipment Operational					T-103 _____
3. Tank Exterior/Containment Structure					
a. Corrosion					
b. Leaking Fixtures or Seam					
c. Cracks or deterioration in Containment Structure					
d. Presence of ponded liquids (obvious sign of leakage)					
e. Sumps: Debris, Deterioration, Cracks					
4. Ancillary Equipment (Pumps, Hoses, Piping, Valves)					
a. Corrosion					
b. Leaking					
c. Malfunctions					
d. Other Deterioration					
5. Truck Bay (Loading/Unloading Area)					
a. Sumps: Operational, Liquids or Solids Present, Cracks, Leaks					
b. Area: Spills, Ponding or Liquids, Odors					
C. CLOSED SCMFs AND UNITS CLOSED AS SCMFs					
1. Leachate seeps present					
2. Above grade leachate detection system operable					
3. Standpipes pumps operational					

Per OAC 3745-55-15

Inspector's Signature: _____

Inspector's Initials _____

Date: _____

Manager's Signature: _____

Manager's Initials _____

Date: _____

Note:

CECOS reserves the right to change the checklist format and content, as long as the requirements outlined in the Post-Closure Inspection Plan are met.

Figure 6. Example Daily Inspection Checklist

**CECOS INTERNATIONAL, INC.
ABER ROAD FACILITY
DAILY INSPECTION CHECKLIST**

January 2012
Revised October 2012

Rainfall: _____
Weather: _____
Temperature: _____
Wind: _____

Begin: Inspection Date _____
Inspection Time _____

End: Inspection Date _____
Inspection Time _____

Inspection Criteria	Problems		RAF Prepared		Comments
	Yes	No	Yes	No	
D. LEACHATE ACCUMULATION TANKS (T104, T105, T108, T109, T110, T111, T112)					
1. Condition of Tanks and Secondary Containment Areas					
a. Deterioration (Corrosion, Cracks)					
b. External Damage (Dents, Bulges)					
c. Protective Coating Deteriorating					
d. Signs of Leaking					
2. Overfill Switch Operational					
3. Condition of Pumps, Hoses, and Valves					
a. Deterioration (Holes, Cracks)					
b. Leaks, Corrosion					
c. Malfunctions					
4. Secondary Containment Area					
a. Signs of Spills					
b. Accumulation of Precipitation with last 24 hours					
c. Liquid Present in Leachate Line Leak Detection Port					
5. Management of Tanks					
a. Accumulation Start Date on Tank					
b. Labeled "Hazardous Waste"					
c. Accumulation period is within 14 days of the 90 day accumulation period					
E. LEACHATE TREATMENT TANKS (T101, T-1, T-2, T-3, T-4, T-5, T-6, T-7, T-8, T-9, T-10, M-1, F1)					
1. Condition of Tanks and Secondary Containment Areas					
a. Deterioration (Corrosion, Cracks)					
b. External Damage (Dents, Bulges)					
c. Protective Coating Deteriorating					
d. Signs of Leaking					
2. Overfill Switch Operational					
3. Condition of Pumps, Hoses, and Valves					
a. Deterioration (Holes, Cracks)					
b. Leaks, Corrosion					
c. Malfunctions					
4. Secondary Containment Area					
a. Signs of Spills					
b. Accumulation of Precipitation with last 24 hours					
c. Liquid Present in Leachate Line Leak Detection Port					

Per OAC 3745-55-15

Inspector's Signature: _____

Inspector's Initials _____

Date: _____

Manager's Signature: _____

Manager's Initials _____

Date: _____

Note:

CECOS reserves the right to change the checklist format and content, as long as the requirements outlined in the Post-Closure Inspection Plan are met.

Figure 6. Example Daily Inspection Checklist, Continued

**CECOS INTERNATIONAL, INC.
ABER ROAD FACILITY
WEEKLY INSPECTION CHECKLIST**

January 2012
Revised October 2012

Begin: Inspection Date _____
Inspection Time _____

End: Inspection Date _____
Inspection Time _____

Inspection Criteria - Monthly Inspection	Problems		RAF Prepared		Comments
	Yes	No	Yes	No	
A. GENERAL SITE AND FACILITY RECORDS					
1. Emergency Exits Obstructed					
2. General					
a. Spills/control dams not functional					
b. Communication equipment					
c. Eyewash facilities operational					
d. Level of water in water tower between 40,000 to 50,000 gallons of water					
3. Spill Control Supplies Adequate					
B. CONTAINER TRANSFER DOCK or LTS Drum Storage Area					
1. Warning Signs Posted					
2. Hazardous waste stored over 90 days (Notify the Environmental Department after 60 day(s))					
3. Containers of chemical supplies or hazardous waste in good condition					
- Area lighting at entrance working					
- Emergency lighting operational					
4. All drums have proper labeling					

Per OAC 3745-55-15

Inspector's Signature: _____

Inspector's Initials _____ Date: _____

Manager's Signature: _____

Manager's Initials _____ Date: _____

Note:

CECOS reserves the right to change the checklist format and content, as long as the requirements outlines in the Post-Closure Inspection Plan are met.

Figure 7. Example Weekly Inspection Checklist

CECOS INTERNATIONAL, INC.
ABER ROAD FACILITY
MONTHLY/QUARTERLY INSPECTION CHECKLIST

January 2012
Revised October 2012

Begin: Inspection Date _____

End: Inspection Date _____

Begin: Inspection Time _____

End: Inspection Time _____

Inspection Criteria - Monthly Inspection	Problems		RAF Prepared		Comments
	Yes	No	Yes	No	
A. GENERAL SITE AND FACILITY RECORDS					
1. Security fencing and entrance gates					
a. Poor condition					
b. Signs of unauthorized entry - Gates Locked					
c. Warning signs missing					
2. Roadways					
a. Obstructions					
b. Deterioration					
c. Operational debris is present					
3. Drainage ditches Storm Sewer System					
a. Obstructions					
b. Evidence of erosion					
c. Presence of operational debris					
d. Ponding of liquids					
4. First Aid and Protective Equipment On-site					
- Storage supplies inventoried and in good working order					
5. Spill control weir, debris/spills behind, boom non-operational					
6. Lighting					
- Area lighting at entrance working					
- Emergency lighting operational					
7. Smoke detectors not operational in buildings					
8. Fire extinguishers on all equipment operational					
B. LEACHATE COLLECTION SYSTEM					
1. PVC piping encasing electrical system					
C. CLOSED SCMFs AND UNITS CLOSED AS SCMFs					
1. Erosion Present of Caps and Slopes					
2. Evidence of Differential Settling or Subsidence on Caps					
3. Poorly vegetated areas on Caps					
4. Deterioration of Standpipe caps/condition of electrical connections					
5. Drainage Ditches Obstructed					
6. Presence of Animal Burrows on Caps					
7. Closed SCMF Carbon Filters - Breakthrough					
D. TRUCK WASH FACILITY					
1. Foundation					
a. Cracks					
b. Deterioration					
Inspection Criteria - Quarterly Inspection					
A. CLOSED SCMFs AND UNITS CLOSED AS SCMFs					
1. Cap survey for settlement					
a. SCMFs where significant settlement has occurred					
2. Condition of benchmarks - plant overgrowth, animal disturbance					
Per OAC 3745-55-15					
B. LEAK DETECTORS AND UNDERDRAINS					
1. Condition of surface pipes - no intrusion					
2. Condition of LD & UD pipe caps					
3. Condition of pumps					

Inspector's Signature: _____

Inspector's Initials _____

Date: _____

Manager's Signature: _____

Manager's Initials _____

Date: _____

Note:

CECOS reserves the right to change the checklist format and content, as long as the requirements outlined in the Post-Closure Inspection Plan are met.

Figure 8. Example Monthly/Quarterly Inspection Checklist

WELL MAINTENANCE EVALUATION CHECKLIST

(U) If OK or initial and date when completed.

Well Number:	_____	Location:	_____	Personnel Present:	_____	Work Completed By Initials and Date	_____
ID Tag in good repair/legible:	_____						
Oil Lock:	_____						
Protective Monument in good repair:	_____						
Protective Monument has weep holes:	_____						
(within 3 inches of ground surface).							
Grout/concrete seal around protective monument							
in good shape:	_____						
Casing cap/seal in place:	_____						
Bailer in well w/stainless steel s-hooks:	_____						
Survey notch filled into top of well casing:	_____						
Cut non-threaded well casing 1/2 - 1" below top of monument:	_____						
Area around sample location graded and free of debris:	_____						
General condition/comments:	_____						
Signature:	_____			Evaluation Date:	_____		

WELL MAINTENANCE EVALUATION CHECKLIST

(U) If OK or initial and date when completed.

Well Number:	_____	Location:	_____	Personnel Present:	_____	Work Completed By Initials and Date	_____
ID Tag in good repair/legible:	_____						
Oil Lock:	_____						
Protective Monument in good repair:	_____						
Protective Monument has weep holes:	_____						
(within 3 inches of ground surface).							
Grout/concrete seal around protective monument							
in good shape:	_____						
Casing cap/seal in place:	_____						
Bailer in well w/stainless steel s-hooks:	_____						
Survey notch filled into top of well casing:	_____						
Cut non-threaded well casing 1/2 - 1" below top of monument:	_____						
Area around sample location graded and free of debris:	_____						
General condition/comments:	_____						
Signature:	_____			Evaluation Date:	_____		

Figure 9. Example Well Maintenance Evaluation Checklist

ENVIRONMENTAL MONITORING
CORRECTIVE ACTION FORM

I. Well Number: _____
Inspection Date: _____
Problem Cited: _____

Field Inspector: _____

II. Proposed Corrective Action

Due Date: _____
Supervisor: _____

III. Verification of Repairs Completed

(Environmental Monitoring Manager) (Date)

Figure 10. Example Groundwater Monitoring Well Corrective Action Form

ABER ROAD

SLURRY WALL

CRESCENT ISLE LAKE

SANITARY LANDFILL

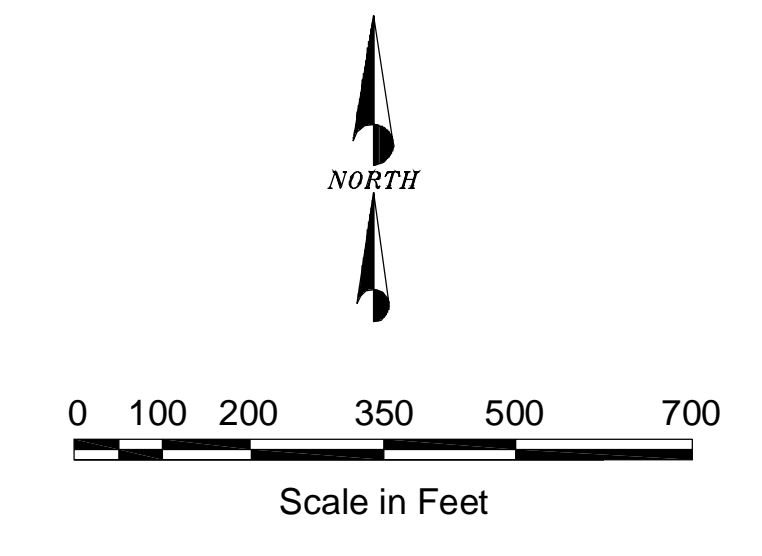
Pleasant Run Creek

East Branch of Pleasant Run Creek

(didn't receive waste)

(didn't receive waste)

Permitted Area Boundary

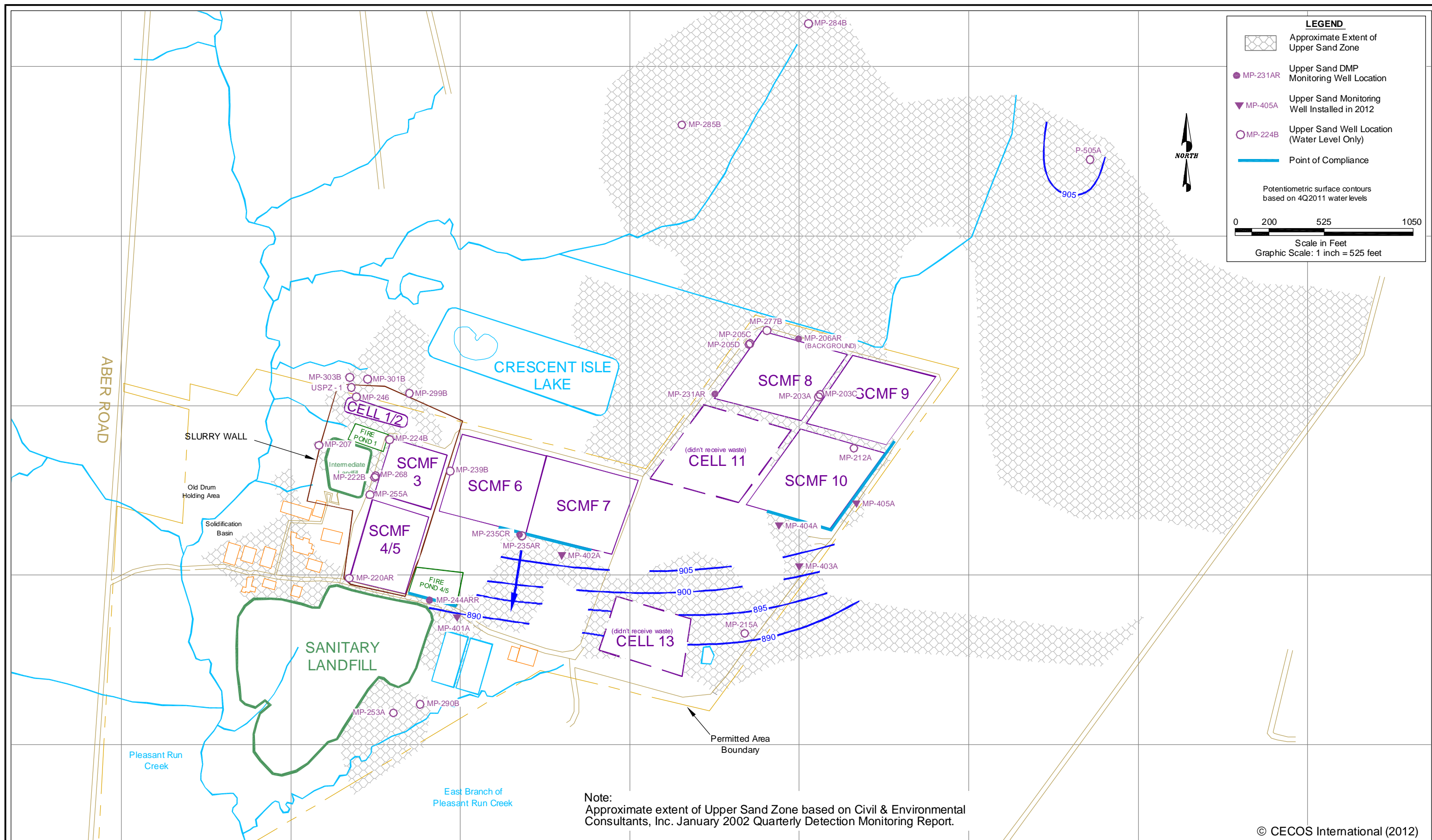


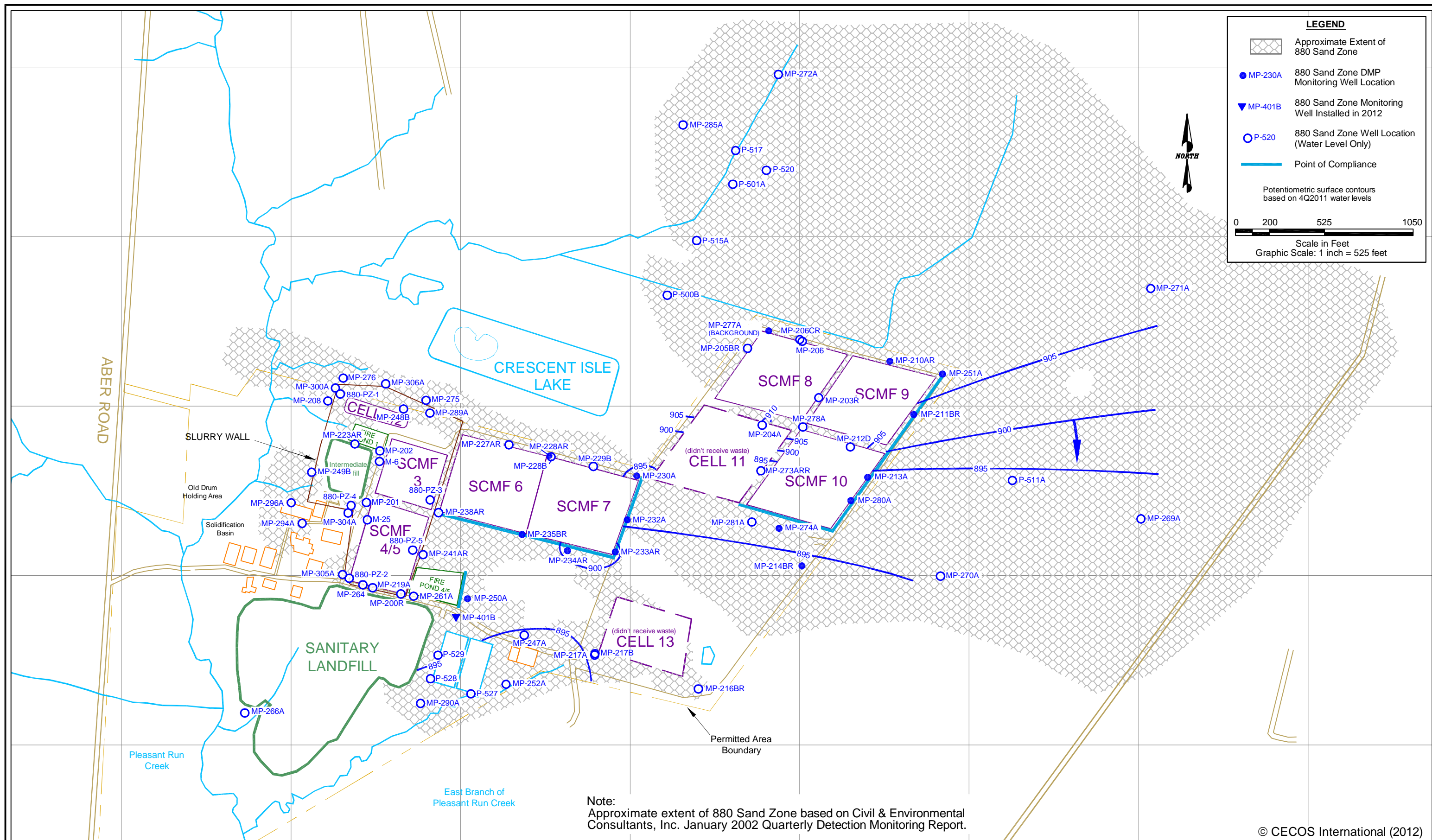
LEGEND

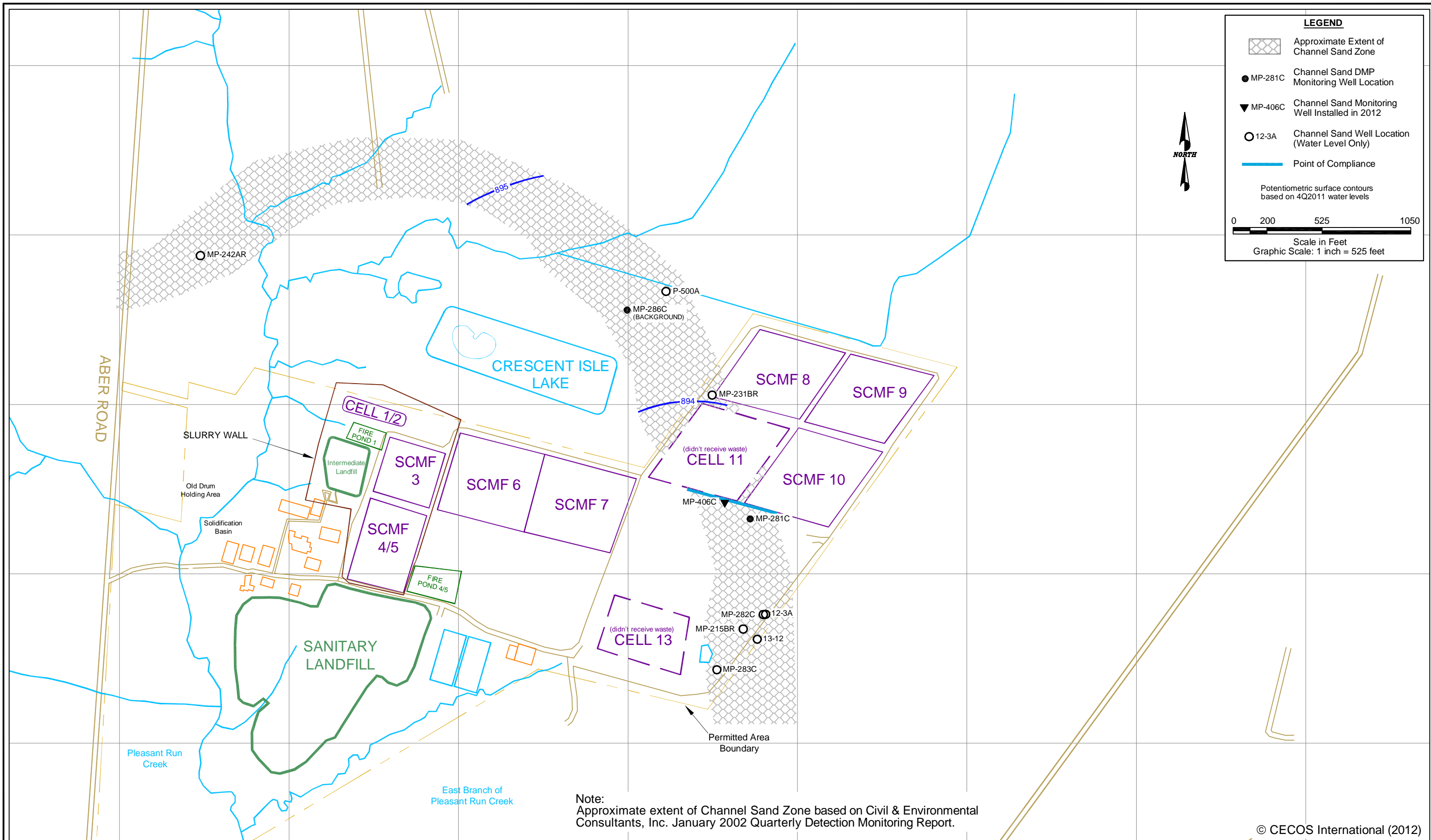
- MP-272A ● 880 Sand Zone Wells
- 12-4 ⚡ Bedrock-Till Interface Wells
- MP-285B ■ Upper Sand Wells
- MP-283C ▲ Channel Sand Wells
- ⊗ Benchmark

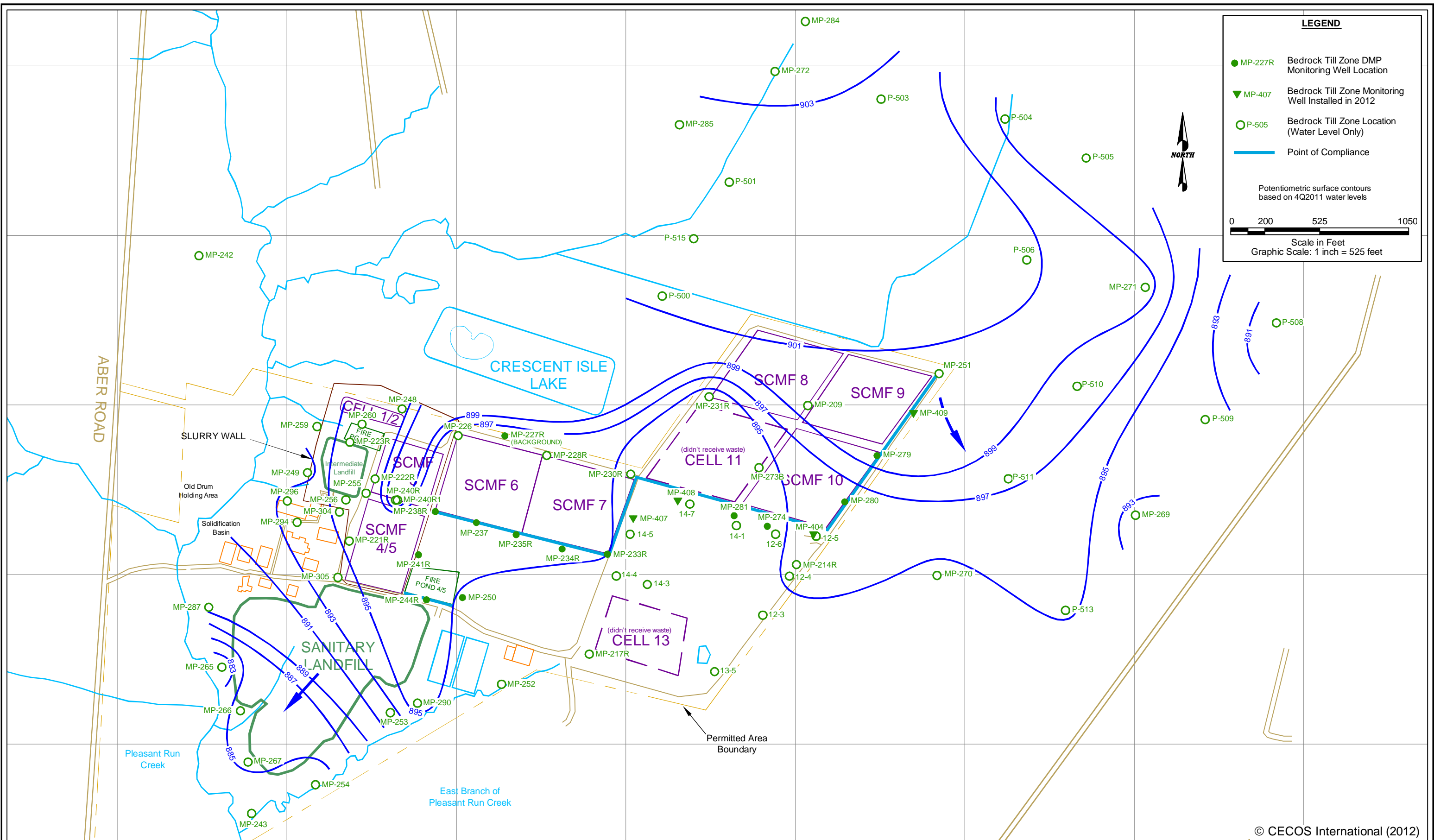
Figure 11
DMP and Potentiometric
Monitoring Well Location Map

Aber Road Facility
Williamsburg, Ohio









© CECOS International (2012)

FIELD INFORMATION FORM

Site Name: _____

Sample Point: _____

WELL DATA	Water-Level Date (MM DD YY)	Water-Level Time (2400 Hr. Clock)	Purge/Sample Method: _____ LF = Low Flow P = Passive Dry = Dry 3-5 = 3-5 well vols. X = Other
	Well Elevation (at TOC) (ft/msl)	Depth to Water (DTW) (from TOC) (ft)	Groundwater Elevation (site datum, from TOC) (ft/msl)
	Total Well Depth (from TOC) (ft)	Water Column Height (well depth - DTW) (ft)	Casing ID (in)

PURGE/SAMPLE EQUIPMENT	Purging and Sampling Equipment...Dedicated <input type="checkbox"/> Y or <input type="checkbox"/> N	Filter Device <input type="checkbox"/> Y or <input type="checkbox"/> N	0.45μ or _____ μ (circle or fill in)
	Purging Device <input type="checkbox"/> A-Submersible Pump D-Bailer	Pump Type (Vol) <input type="checkbox"/> A-P1200M (495 ml) C-P1150 (130 ml)	
	Sampling Device <input type="checkbox"/> B-Peristaltic Pump E-Piston Pump	B-P1101M (395 ml) X-Other	
	X-Other _____	Tubing ID (Vol/Ft) <input type="checkbox"/> A-3/8" ID (22 ml/ft) C-0.17 ID (4.5 ml/ft)	

PURGE INFO	PURGE DATE (MM DD YY)	START PURGE TIME (2400 Hr. Clock)	ELAPSED HRS (hrs:min)	WATER VOL (L: Gal) IN (PUMP/TUBING: WELL CASING) circle one of each	ACTUAL VOL PURGED (Liters: Gallons) circle one	(PUMP/TUBING: WELL) VOLS PURGED (optional)

STABILIZATION DATA	Time (2400 Hr Clock)	DTW (ft)	Vol. Purged (L : Gals) circle one	pH (std)	Conductance (μmhos/cm)	Temp (°C)	Other Units: _____	Rate (ml/min)

Suggested range for 3 consec. readings or Permit/State requirements may be entered in spaces provided above (optional).

FIELD DATA	SAMPLE DATE (MM DD YY)	SAMPLE TIME (2400 Hr. Clock)	VOL PURGED (L : Gals) circle one	pH (std)	CONDUCTANCE (umhos/cm)	TEMP (°C)	TURBIDITY (ntu)	ORP (mv)

Sample Appearance: _____ Odor: _____ Color: _____ Other: _____

Weather Conditions (at sample time): Wind Speed/Direction: _____ Air Temp: _____ Precipitation: Y or N

Specific Comments (including purge/well volume calculations if required): _____

FIELD COMMENTS	_____

I certify that sampling procedures were in accordance with applicable EPA, State, and Site protocols:

Date / / Name Signature Company

phone 716.504.9852 fax 716.691.7991

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc.

Figure 17. Example Chain of Custody

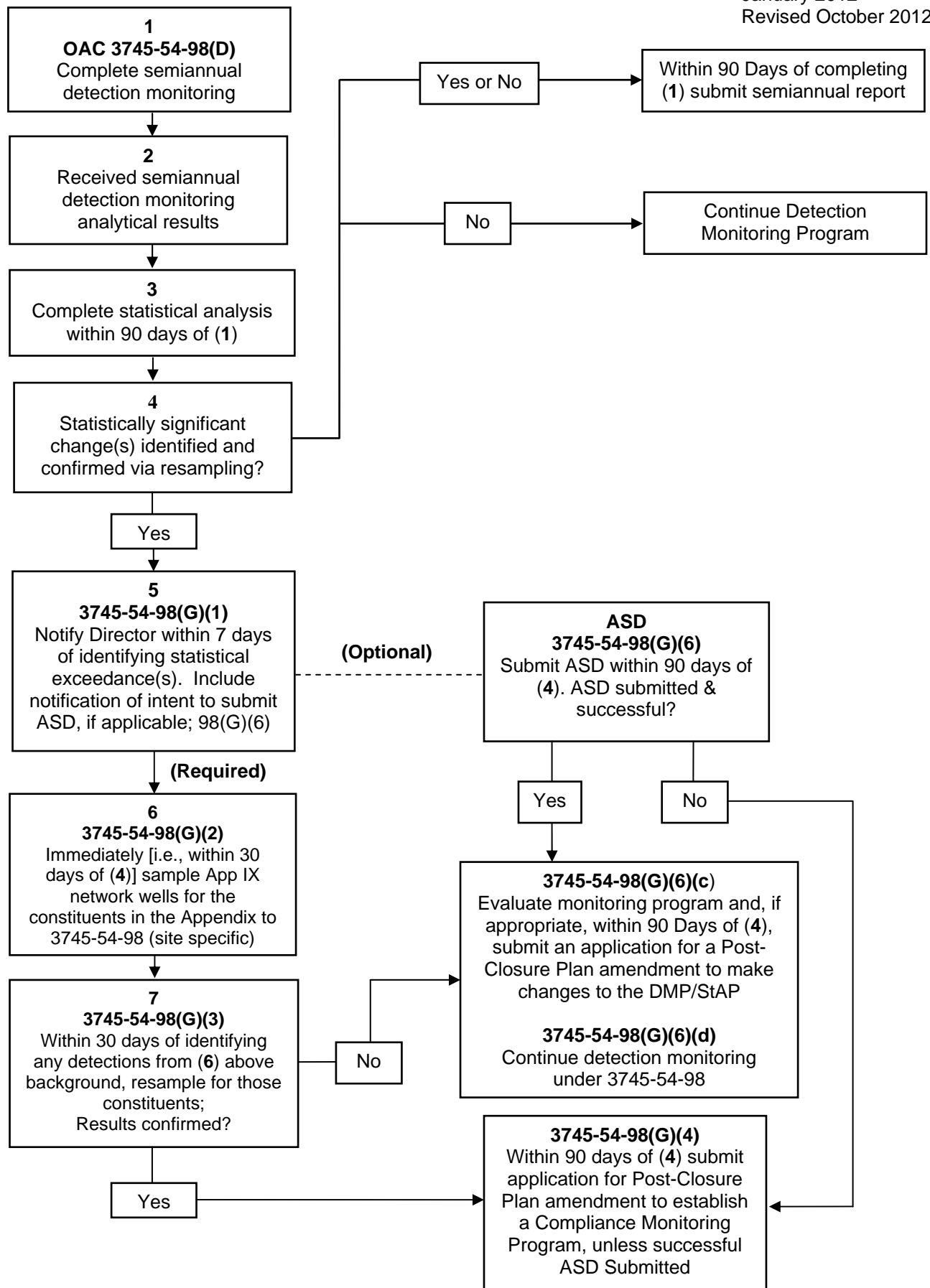


FIGURE 18. REGULATORY COMPLIANCE FLOW CHART

APPENDICES

APPENDIX A FEBRUARY 12, 1997 OHIO EPA CLOSURE APPROVAL LETTER



State of Ohio Environmental Protection Agency

STREET ADDRESS:

100 WaterMark Drive
Columbus, OH 43215-1099

TELE: (614) 644-3020 FAX: (614) 644-2329

MAILING ADDRESS:

P.O. Box 1049
Columbus, OH 43216-1049

February 12, 1997

RE: Completion of Closure
CECOS International, Inc.
U.S. EPA ID No.: OHD 087 433 744

RECEIVED

FEB 17 1997

**CECOS INTERNATIONAL
OHIO DISTRICT**

Ms. Constance S. Dall
Ohio District Manager
CECOS International, Inc.
5092 Aber Road
Williamsburg, Ohio 45176

Dear Ms. Dall:

According to Ohio EPA records, on September 23, 1994, the Director of the Ohio EPA approved a modified closure plan for CECOS International, Inc. for selected hazardous waste management units and operations support facilities. The Ohio EPA has also received certification documents stating that those selected units and operations support have been closed according to the specifications in the approved modified closure plan. Ohio EPA District Office personnel completed a closure inspection and a review of documents pertaining to these areas on January 16, 1997.

Based on this inspection and review, and previous partial closures of SCMFs 3, 4/5, 6, 7, 8, 9, 10, and Fire Pond 1, the Ohio EPA has determined that all hazardous waste management units and support facilities required for the operation of a treatment, storage, and disposal facility (TSD) have been closed in accordance with the approved closure plan and Rules 3745-66-12 through 3745-66-15 of the Ohio Administrative Code (OAC). Furthermore, it is acknowledged that CECOS International, Inc. will immediately commence conducting those scheduled post closure activities detailed within the facility's approved plan.

CECOS International, Inc. remains a hazardous waste treatment, storage and disposal (TSD) facility. Also, hazardous waste leachate (F039) is still being generated and must be collected and disposed of. CECOS International, Inc. remains a large quantity generator (LQG) under the provisions of OAC 3745-52 and related rules. As specified in OAC Rule 3745-66-40, CECOS International, Inc. will not be required to maintain financial assurance for closure costs and liability coverage for accidental occurrences at this location, in accordance with OAC Rules 3745-66-43(H) and 3745-66-47(E).

Please note that this letter does not relieve the facility of any corrective action responsibilities that may be required.


George V. Voinovich, Governor
Nancy P. Hollister, Lt. Governor
Donald R. Schregardus, Director

1439700216

Ms. Constance S. Dall
February 12, 1997
Page 2

If you have any questions concerning the closure process or the current status of the facility, please contact the Ohio EPA, Southwest District Office, Attn: Jim Penrod, P.O. Box 641, Owensville, Ohio 45160, tel.: 513-724-1522.

Sincerely yours,

A handwritten signature in cursive script, reading "Thomas E. Crepeau".

Thomas E. Crepeau, Manager
Data Management Section
Division of Hazardous Waste Management

cc: Jim Penrod, SWDO
Don Marshall, SWDO
Maria Velalis, DHWM
Fran Migliorino, Ohio Department of Development
Montee Suleiman, Closure Unit, RES, DHWM

APPENDIX B
AUGUST 4, 1998 U.S. EPA REGION 5
CMI CC APPROVAL LETTER



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5

77 WEST JACKSON BOULEVARD

CHICAGO, IL 60604-3590

August 4, 1998

REPLY TO THE ATTENTION OF:

DE-9J

CERTIFIED MAIL

P140893 290

RETURN RECEIPT REQUESTED

Mr. Gary Saylor
CECOS International, Inc.
5092 Aber Road
Williamsburg, Ohio 45176

RE: Approval of CMI CC Report
CECOS International, Inc.
OHD 087 433 744

Dear Mr. Saylor:

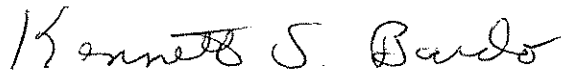
The United States Environmental Protection Agency (U.S. EPA) has completed a review of Revision 1 to the *Corrective Measure Implementation Construction Completion Report* (CMI CC Report) and CECOS' Response to Comments submitted on July 6, 1998, for the referenced facility. The revision to the CMI CC Report was required to address the comments/deficiencies provided in U.S. EPA's May 15, 1998, letter disapproving the CMI CC Report. A U.S. EPA representative also conducted a site visit (final inspection) at the CECOS facility on June 24, 1998. The final inspection was conducted in order to determine whether the outstanding construction items had been addressed.

U.S. EPA's final inspection confirmed that CECOS has accomplished a majority of the site work activities required to complete construction that were documented in U.S. EPA's May 15, 1998, letter. These activities include final grading and seeding of the landfill caps and perimeter drainageways, coating of the Accumulation Point Building concrete floor, and final surveying of the slurry wall alignment and final grade elevation of the landfill covers. At the time of the inspection, the installation of monuments to delineate the location of the slurry wall was not complete. Surveyors had marked each corner and CECOS intended to install permanent markers. CECOS also indicated that the centerline of the slurry wall would be marked with signs and sign posts at 100-foot intervals along the slurry wall alignment so as to be visible to CECOS maintenance personnel.

Based on the CMI Construction Completion final inspection conducted on June 24, 1998, and a review of Revision 1 of the CMI CC Report and Response to Comments submitted by CECOS on July 6, 1998, U.S. EPA concludes that the Corrective Measure Construction has been substantially performed and the Construction Performance Standards have been substantially achieved. U.S. EPA hereby approves Revision 1 of the CMI CC Report with the enclosed conditions and/or modifications.

If you have any questions regarding this matter, please contact me at 312.886.7566.

Sincerely yours,

A handwritten signature in cursive script that reads "Kenneth S. Bardo".

Kenneth S. Bardo, Project Manager
Enforcement & Compliance Assurance Branch

Enclosure

cc: Michael Savage, OEPA-CO
Don Marshall, OEPA-SWDO
Jim Penrod, OEPA-SWDO

ENCLOSURE

Corrective Measure Implementation Construction Completion Report

Revision 1 Conditions and/or Modifications

Based on U.S. EPA's June 24, 1998, final inspection, several construction items were noted that need to be addressed as part of the operation and maintenance (O&M) of the corrective measure. Beginning the tenth day of the first full month after receipt of this letter, CECOS shall submit quarterly O&M Progress Reports as provided for in Section XIV.1 the Administrative Order on Consent, U.S. EPA Docket No. V-W-024-94. The frequency of O&M Progress Reports may be adjusted to semi-annually upon full performance and achievement of the items listed below.

1. Establishment of a stable vegetative cover, with no gaps in vegetation, on the top surface of the Intermediate Landfill and Firepond 1 final covers.
2. Repair and stabilization of erosional features that were present on the top surface and side slopes of the Intermediate Landfill and Firepond 1 final covers.
3. Regrading of the drainage ditches around the perimeter of the Intermediate Landfill and Firepond 1 in areas where run-off water was ponded and repair of erosion damage present between the Intermediate Landfill and Firepond 1.
4. Regrading of the ground surface above the slurry wall alignment to prevent ponding of water above the slurry wall, especially near the leachate trestle and along the northern leg of the slurry wall.
5. Establishment of a stable vegetative cover, with no gaps in vegetation, on the ground surface above the slurry wall to minimize soil erosion.
6. Construction of permanent survey markers at major corners of the slurry wall alignment to allow for the future locating of the slurry wall and the installation of signs and sign posts along the center line of the slurry wall to ensure that the location of the slurry wall is clearly evident to CECOS personnel.
7. Placement of markers to delineate the actual location of the Tensar Geogrid crossing in the northeast corner of the slurry wall. Adequate marking of the crossing is required to ensure that the gravel roadway that crosses the slurry

wall at this location is completely underlain by the engineered crossing materials.

8. Adjustment or repair of the high level alarm and shut-off switch in groundwater accumulation tank T-202B to ensure that it is working according to specifications.
9. Operation of the overflow pipe from groundwater accumulation tank T-202A to tank T-202B in a manner to ensure that it is capable of managing the highest anticipated groundwater gradient control system flow rates without requiring additional discharge directly to tank T-203 and without pressurizing the primary inflow tank (T-202A).
10. Modification of SOP-CMI-9 of the CMI O&M Manual. During the final inspection, CECOS indicated that accumulation tank T-202A would be used as a primary inflow tank and that accumulation tank T-202B would be used as an overflow tank. The intent is to allow solids to settle out in tank T-202A before allowing water to overflow to tank T-202B. Water from tank T-202B would then be pumped into tanker trucks for off-site disposal. This operation appears to be different than that currently proposed in SOP-CMI-9. The SOP also needs to discuss any new inspection requirements for tank T-202A regarding sediment buildup.
11. Modification of the CMI O&M Manual regarding the weekly inspection of pump and pipe connections within the leachate standpipes and groundwater gradient control wells for leaks. During the final inspection, CECOS indicated that the ball valve between the primary well casing and the protective casing at well GC-13 had leaked. All leaking valves and pipe fittings would be fixed prior to beginning full scale operation of the system. These valves and pipe fittings will require inspection on a regular basis.

Table 4.1 of the CMI O&M Manual indicates that for the Leachate Collection System and Groundwater Gradient Control Wells, verification that pipe connections on pumps are tight will be performed on a weekly basis. This requirement is not reflected in SOP-CMI-2 and SOP-CMI-7. Revise the SOPs to specifically address the verification of the tightness and integrity of the pump and pipe connections for the leachate collection standpipes and the gradient control wells.

APPENDIX C
SURVEY PLAT AND NOTICE OF DEED

DEED NOTIFICATION/RESTRICTIONS

'94 NOV 9 AM 10 34

CECOS INTERNATIONAL, INC.
WILLIAMSBURG, OHIO

CLERMONT CO. RECORDER
BATAVIA, OHIO

031298

BOOK 569 PAGE 459

DECLARATION OF RESTRICTION ON USE OF REAL PROPERTY

The record owner (CECOS International, Inc., see Deed Book Volume 684, page 731) hereby declare and impose the following restrictions on the real property (also known as the CECOS Aber Road Facility - "CECOS") located in Williamsburg, Ohio, and more particularly described as follows:

Situated in Jackson Township, Clermont County, Ohio and in Lytle Military Survey No. 4782 and Lytle Military Survey No. 3331 and being more particularly described as follows:

Beginning at an iron pin at the northeast corner of Lot No. 1 of Aber Road Subdivision as recorded in Plat Book "I" page 23 of the Clermont County, Ohio Deed Records and in the south line of Lytle Military Survey No. 4780; thence, with said Military Survey Line, S. 74°56'21"E. 284.90' to a stone at the southeast corner of said Lytle Military Survey No. 4782; thence with the east line of said Military Survey, N. 35°51'39"E. 194.87' to an iron pin corner to William & Patsy A. Geier; thence, with the line of said Geier, S. 75°23'42"E. 2372.26' to an existing iron pin; thence, partially with the line of said Geier and with the line of Joseph & Mary Lushek, N. 35°32'37"E. 1113.45' to an existing iron pin; thence, with another line of said Lushek, S. 75°05'13"E. 1244.35' to an existing iron pin in the easterly line of Lytle Military Survey No. 3331; thence, with said Military Survey Line, S. 36°04'05"W. 1499.99' to an existing iron pin and S. 36°27'20"W. 999.22' to an iron pin; thence, with lines of George White, et al, N. 76°22'33"W. 1026.92' to an iron pin, S. 59°16'11"W. 1980.00' to an iron pin, S. 6°01'11"W. 269.61' to an iron pin, S. 34°16'11"W. 264.00' to an iron pin, S. 49°41'24"W. 159.50' to an iron pin, N. 82°23'52"W. 151.02' to an iron pin and S. 59°38'43"W. 136.82' to an iron pin in the line of Warren & Gail Woods; thence, with lines of said Woods, N. 57°02'47"W. 352.01' to an iron pin and N. 71°13'58"W. 78.71' to a spike in the centerline of Aber Road; thence, with the centerline of said Aber Road, N. 3°24'00"E. 2200.40'; thence, S. 77°58'00"E. 398.38' to the southeast corner of Lot No. 11 of Aber Road Subdivision; thence, with the east line of said Subdivision, N. 3°24'00"E. 871.93' to an iron pin at the northeast corner of Lot No. 2; thence, N. 74°56'21"W. 400.00' to the northwest corner of Lot No. 2 in Aber Road; thence, with said Aber Road, N. 3°24'00"E. 51.07' to the southwest corner of Lot No. 1; thence, S. 74°56'21"E. 400.00' to an iron pin at the southeast corner of Lot No. 1; thence, N. 3°24'00"E. 100.00' the place of beginning and containing 207.959 acres of land subject to legal highways and easements of record.

This description being the same as recorded in Volume 684, page 733 of the Clermont County, Ohio Records.

RECITALS

WHEREAS, the United States Environmental Protection Agency (U.S. EPA) has issued a Record of Decision adopting remedy which requires corrective measures to be undertaken at the Facility and institutional controls to assure that the remedy is protective of human health and the environment;

WHEREAS, the United States Environmental Protection Agency and Respondent, CECOS International Inc., have entered into a Consent Order which concerns the corrective measures be undertaken at the CECOS Facility.

NOW, THEREFORE, by this instrument there are created, declared and established at the property the following restrictive covenants and requirements, which shall, unless amended, run with land and remain in full force and effect in perpetuity from

the date hereof, irrespective of any sale, conveyance, alienation, or other transfer of any interest or estate in such property.

RESTRICTIONS APPLICABLE TO THE PROPERTY

BOOK 569 PAGE 460

The following restrictions shall apply to the property described above:

1. There shall be no consumptive or other use of the groundwater underlying the property;
2. There shall be no use of, or activity at, the property that may interfere with the Work performed or to be performed under the Consent Order at the property, or any activity which may damage any remedial component contracted for or installed pursuant to the Consent Order or otherwise impair the effectiveness of any Work to be performed pursuant to the Consent Order;
3. There shall be no installation, construction, removal or use of any buildings, wells, pipes, roads, ditches or any other structures at the property except as approved by the U.S. EPA as consistent with the Consent Order and SOW; and
4. There shall be no residential use of the property.

The restrictions specified above shall continue in full force and effect until the Consent Order is terminated or until such time as the U.S. EPA issues a determination in writing or the court rules to either modify or terminate the restrictions in response to a petition from the owner(s) of the property, as provided below.

COPY OF RESTRICTIONS

A copy of these restrictions shall be provided by the owner(s) of the property to all respective successors, assigns and transferees of the property.

PETITION TO MODIFY OR TERMINATE DEED RESTRICTIONS

After all Work, as defined in the Consent Order and SOW, has been completed and upon achievement of Performance Standards, consistent with the Consent Order and SOW, the owner(s) of the property may petition the Regional Administrator of the U.S. EPA, Region 5, or his delegate, to modify or terminate the deed restrictions. Any petition for modification or termination shall state the specific provision sought to be modified or terminated and any proposed additional uses of the property. Any proposed modification or terminations must not be inconsistent with the requirements set forth in the Consent Order and SOW.

The property owner(s) shall provide to the Respondents copy of any petition for modification or termination of deed restrictions submitted to the U.S. EPA. Any party may object to the proposed use of the property on the grounds that such use is not consistent with the Consent Order or the SOW, or may result in exceedances of the Performance Standards required by the Consent Order. Any party so objecting shall notify the owner(s) of the property, the U.S. EPA, and the State of Ohio in writing, within thirty (30) days of receipt of the petition. The Regional Administrator may allow or deny the owner's petition for modification or termination in whole or in part. Any dispute as to the Regional Administrator's determination is subject to Section XVI (Dispute Resolution) of the Consent Order.

SEVERABILITY

If any provision of this Declaration of Restriction On Use of Real Property is held to be invalid by any court of competent jurisdiction, the invalidity of such provision shall

not affect the validity of any other provisions hereof. All such other provisions shall continue unimpaired in full force and effect.

CONFLICT OF LAWS

If any provision of this Declaration of Restriction On Use of Real Property is also the subject of any law or regulation established by any federal, state or local government, the stricter of the two standards shall prevail.

HARMONIOUS CONSTRUCTION

No provision of this Declaration of Restriction On Use of Real Property shall be construed so as to violate any applicable zoning laws, regulations or ordinances. If any such conflict does arise, the applicable zoning laws, regulations or ordinances shall prevail, unless they are inconsistent with RCRA or CERCLA.

* * *

The undersigned persons executing this Declaration of Restrictions On Use of Real Property on behalf of the owner(s) of the property represent and certify that they are duly authorized and have been fully empowered to execute this Declaration.

IN WITNESS WHEREOF, the owner(s) of the property have caused this Declaration of Restrictions On Use of Real Property to be executed on this 9th day of November, 1994.

OWNER RESPONDENT

By: Constance S. Dall
Vice President
CECOS International, Inc.

In the Presence of:

[Signature]
Witness,
[Signature]
Witness

State of Ohio) ss. Before me, a Notary Public in and for said County and State,
Brown County) personally appeared Constance S. Dall on the behalf of CECOS International, Inc. who acknowledged that she did sign the foregoing instrument and that the same is the free act and deed of said corporation.

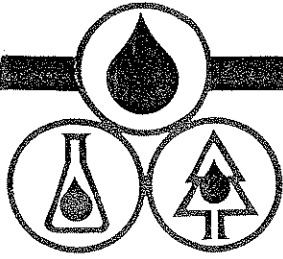
In Testimony Whereof, I have hereunto set my hand and official seal, at Clermont County, this 9th day of November, 1994.

Shelly R. Moler
Notary Public

This instrument was prepared by:

United States Environmental Protection Agency
Region 5, RCRA Enforcement Branch
77 West Jackson Boulevard
Chicago, Illinois 60604

SHELLY R. MOLER
Notary Public, State of Ohio
My Commission Expires Oct. 7, 1998



CECOS
INTERNATIONAL

5092 Aber Road
Williamsburg, Ohio 45176
513/724-6114

April 17, 1997

Mr. Donald Schregardus
Director
Ohio Environmental Protection Agency
1800 WaterMark Drive
Columbus, Ohio 43266-0149

**RE: Post-Closure Deed Notice Certification;
CECOS International, Inc.; OHD087433744/05-13-0011**

Dear Mr. Schregardus:

In accordance with OAC 3745-66-19(B)(2), and on behalf of CECOS International, Inc., I hereby submit the following certification:

I certify that the attached document titled, "Deed Notification/Restrictions CECOS International, Inc. Williamsburg, Ohio Declaration of Restriction on Use of Real Property", has been recorded in the Office of the County Recorder for Clermont County and that the document, as recorded, contains the notation specified in paragraph (B)(1) of OAC 3745-66-19.

Sincerely,
CECOS International, Inc.

Constance S. Dall
District Vice-President

Attachment

Cy: James Penrod, OEPA
Ken Bardo, USEPA-V
File L:16.7, B.2



Recycled Paper

1439700430

DEED NOTIFICATION/RESTRICTIONS
CECOS INTERNATIONAL, INC.
WILLIAMSBURG, OHIO
Declaration of Restriction on Use of Real Property

The record owner, CECOS International, Inc., a corporation ("Owner") hereby provides public notice about, and imposes restrictions on, real estate described herein.

1. Notice is hereby provided by Owner that the real estate commonly known as 5092 Aber Road, Williamsburg, Clermont County, Ohio ("Facility") has been used to manage hazardous wastes.
2. Notice is hereby provided that Owner, pursuant to conditions imposed on Owner by Ohio EPA through Ohio Administrative Code closure and post-closure rules, imposes certain restrictions on the following described real estate which is a subparcel of the Facility, which subparcel shall hereinafter be referred to as the "Area."

Situated in Jackson Township, Clermont County, Ohio and in Lytle Military Survey No. 4782 and Lytle Military Survey No. 3331 and being more particularly described as follows:

Beginning at an iron pin at the northeast corner of Lot No. 1 of Aber Road Subdivision as recorded in Plat Book "1" page 23 of the Clermont County, Ohio Deed Records and in the south line of Lytle Military Survey No. 4780; thence, with said Military Survey Line, S.74°56'21"E.284.90' to a stone at the southeast corner of said Lytle Military Survey No. 4782; thence with the east line of said Military Survey, N. 35°51'39"E. 294.87' to an iron pin corner to William & Patsy A. Geier; thence, with the line of said Geier, S.75°23'42"E. 2372.26' to an existing iron pin; thence, partially with the line of said Geier and with the line of Joseph & Mary Lushek, N.35°32'37"E. 1113.45' to an existing iron pin; thence, with another line of said Lushek, S.75°05'13"E. 1244.35' to an existing iron pin in the easterly line of Lytle Military Survey No. 3331; thence, with said Military Survey Line, S.36°04'05"W. 1499.99' to an existing iron pin and S.36°27'20"W. 999.22' to an iron pin; thence, with lines of George White, et al, N.76°22'33"W. 1026.92' to an iron pin, S.59°16'11"W. 264.00' to an iron pin, S.49°41'24"W. 159.50' to an iron pin, N.82°23'52"W. 151.02' to an iron pin and S.59°38'43"W. 136.82' to an iron pin and N.71°13'58"W. 78.71' to a spike in the centerline of Aber Road; thence, with the centerline of said Aber Road, N.3°24'00"E. 2200.40'; thence, S.77°58'00"E. 398.38' to the southeast corner of Lot No. 11 of Aber Road Subdivision; thence, with the east line of said Subdivision, N.3°24'00"E. 871.93' to an iron pin at the northeast corner of Lot No. 2; thence, N.74°56'21"E. 400.00' to the

northwest corner of Lot No. 2 in Aber Road; thence, with said Aber Road, N.3°24'00"E. 51.07' to the southwest corner of Lot No. 1; thence, S.74°56'21"E. 400.00' to an iron pin at the southeast corner of Lot No. 1; thence, N.3°24'00"E. 100.00' the place of beginning and containing 207.959 acres of land subject to legal highways and easement of records.

This description being the same as recorded in Volume 684, page 733 of the Clermont County, Ohio Records.

3. Notice is hereby provided by Owner that the survey plot and record of the type, location and quantity of hazardous constituents to remain in-situ at the Aber Road facility have been filed with the Jackson Township Zoning Commission, Ohio EPA and USEPA.
4. Notice is hereby provided by Owner that the record of the type, location, and quantity of hazardous wastes disposed of within each cell at the Aber Road facility, as required by rule 3745-66-16 of the Administrative Code and paragraph (A) of rule 3745-66-19 has been filed with the Jackson Township Zoning Commission and with the Director of the Ohio EPA.
5. The Owner hereby imposes the following restriction on the Area:

Future use of the Area is restricted under OAC 3745-27-13 and pursuant to the approved closure plan.
6. These restrictions are in addition to the restrictions on use of real property recorded in the book Vol. 887, page 371, of the Miscellaneous Records, Recorder's Office, Clermont County, Ohio.

IN WITNESS WHEREOF, the said Owner has caused this Deed Notification/Restrictions to be executed on this 17th day of APRIL, 1997.

WITNESSES:

Donald H. Funderburk
Brian T. Gerson

CECOS International, Inc.

By: *Constance S. Dall*
Title: VICE PRESIDENT

STATE OF OHIO

:

:

COUNTY OF CLERMONT

:

Before me, a Notary Public in and for said County and State personally appeared CONSTANCE S. DALL, and acknowledges the execution of the foregoing Deed Notification/Restrictions for and on behalf of CECOS International, Inc.

Witness my hand and Notarial Seal this 17th day of April, 1997.

Shelly R Moler
Notary Public

SHELLY R. MOLER
Notary Public, State of Ohio
My Commission Expires Oct. 7, 1998

APPENDIX D
POST-CLOSURE COST ESTIMATE

CECOS International, Inc.

Ohio EPA No: _____

POST-CLOSURE COST ESTIMATE SITE INFORMATION

I. General Site Information			
a.	Facility Name	CECOS International, Inc.	
b.	Ohio EPA ID		
c.	Total Permitted Area		acres
e.	Year Landfill Closed	1997	YEAR
II. Construction Information			
a.	Number of Groundwater Monitoring Wells	45	wells
b.	Number of Gas Monitoring Probes		probes
c.	Number of Leachate Sumps		sumps
d.	Number of Leachate Monitoring Points	1	
e.	Number of Surface Water Monitoring Points	0	
f.	Number of Active Gas Extraction Wells	0	wells
g.	Underdrain Monitoring Points	0	wells
h.	Leak Detection Monitoring Points	0	sumps
i.			
j.			
k.			
III. Inflation Factor Information			
a.	Year of Base Unit Cost Estimate	2012	
b.	Current Estimate Year	2012	
c.	Current Inflation Factor	1	
d.	Cummulative Inflation Factor from Base Year to Current Year	1	

CECOS International, Inc.

Ohio EPA No. _____

**POST-CLOSURE COST ESTIMATE
SUMMARY TABLE**

Activity		Total Cost
I	Groundwater Monitoring	\$ 2,292,654
II	Explosive Gas Migration Monitoring	\$ -
III	Leachate Monitoring	\$ 270,000
IV	Surface Water Monitoring	\$ -
V	Operation & Maintenance - Leachate Collection System	\$ 8,295,816
VI	Operation & Maintenance - Groundwater Monitoring Wells	\$ 127,500
VII	Operation & Maintenance - Gas Control System	\$ -
VIII	Operation & Maintenance - Explosive Gas Monitoring System	\$ -
IX	Utilities for Operation	\$ 1,237,032
X	Maintenance of Cover System	\$ 2,032,340
XI	Operation & Maintenance - Surface Water Management System	\$ -
XII	Operation & Maintenance - Access Control Structures	\$ 116,831
XIII	Subtotal of Post-Closure Costs (30 Years)	\$ 14,372,173
	CLOSURE YEAR	1997
	REMAINING YEARS FOR POST-CLOSURE CARE	15
	TOTAL POST-CLOSURE CARE BALANCE FOR REMAINING YEARS	\$ 7,186,087
XIV	Administration % of subtotal: 5%	\$ 718,609
XV	Certificate of post closure	\$ 20,000
XVI	Contingency/Remediation Costs % of subtotal: 10%	\$ 1,437,217
XVII	TOTAL COST OF POST-CLOSURE (Sum of lines XIII to XVI)	\$ 9,361,913

Add Notes here: Assume Post-Closure plan takes affect 5/1/2012 for the years remaining calculation

CECOS International, Inc.

Ohio EPA No. _____

ANNUAL POST-CLOSURE COST BREAKDOWN

I. <u>Groundwater Monitoring</u>						
# Appendix I Wells:		45	Frequency App. I Parameters (per year)		2	
# Appendix II Wells:			Frequency App. II Parameters (per year)			
Activity Item	Unit	Quantity	Base Unit Cost	Current Unit Cost	Subtotal	Additional Comments
a. Semi-Annual Analyses	Event	2	\$ 8,100.00	\$ 8,100.00	\$ 16,200	
b. Semi-Annual Sampling	Event	2	\$ 22,793.40	\$ 22,793.40	\$ 45,587	
c. Semi-Annual Reports	Event	2	\$ 3,000.00	\$ 3,000.00	\$ 6,000	
d. Semi-Annual Stats	Event	2	\$ 3,567.50	\$ 3,567.50	\$ 7,135	
e. Well Maintenance	Event	1	\$ 1,500.00	\$ 1,500.00	\$ 1,500	
e.	Event			\$ -	\$ -	
Subtotal					\$ 76,422	

II. <u>Explosive Gas Migration Monitoring</u>						
Activity Item	Unit	Quantity	Base Unit Cost	Current Unit Cost	Subtotal	Additional Comments
a.				\$ -	\$ -	
b.				\$ -	\$ -	
c.				\$ -	\$ -	
Subtotal					\$ -	

III. <u>Leachate Monitoring</u>						
# Leachate Sampling Points:		0	Frequency of Sampling (per year)		1	
Activity Item	Unit	Quantity	Base Unit Cost	Current Unit Cost	Subtotal	Additional Comments
a. Analyses	EA	1	\$ 9,000.00	\$ 9,000.00	\$ 9,000	
b.				\$ -	\$ -	
c.				\$ -	\$ -	
d.				\$ -	\$ -	
Subtotal					\$ 9,000	

IV. <u>Surface Water Monitoring</u>						
# Sampling Points:		3	Frequency of Sampling (per year):		2	
Activity Item	Unit	Quantity	Base Unit Cost	Current Unit Cost	Subtotal	Additional Comments
a.				\$ -	\$ -	
b.				\$ -	\$ -	
c.				\$ -	\$ -	
d.				\$ -	\$ -	
Subtotal					\$ -	

V. <u>Operation & Maintenance - Leachate Collection System</u>						
Activity Item	Unit	Quantity	Base Unit Cost	Current Unit Cost	Subtotal	Additional Comments
a. Effluent Haul and Disposal	GAL/YR	320000	\$ 0.4500	\$ 0.45	\$ 144,000	\$0.22 Disposal, \$1173/5,000 tanker
b. Effluent Taxes & Fees	GAL/YR	320000	\$ 0.0210	\$ 0.02	\$ 6,732.00	
c. Solids & PCBs Haul & Dipose	LS/YR	1	\$ 25,000.00	\$ 25,000.00	\$ 25,000	
d. Maintenance Labor	LS/YR	1	\$ 61,851.60	\$ 61,851.60	\$ 61,852	
e. Operation Costs	LS/YR	1	\$ 5,727.00	\$ 5,727.00	\$ 5,727	
f. Pump Replacement	LS/YR	1	\$ 17,181.00	\$ 17,181.00	\$ 17,181	
g. Piping Repair	LS/YR	1	\$ 6,872.40	\$ 6,872.40	\$ 6,872	
h. Tank Repair	LS/YR	1	\$ 2,290.80	\$ 2,290.80	\$ 2,291	
i. Treatment Chemicals	LS/YR	1	\$ 6,872.40	\$ 6,872.40	\$ 6,872	
j.				\$ -	\$ -	
Subtotal					\$ 276,527	

VI. <u>Operation & Maintenance - Groundwater Monitoring Wells</u>						
# wells installed:			Ave. Depth			
Activity Item	Unit	Quantity	Base Unit Cost	Current Unit Cost	Subtotal	Additional Comments
a. Well Replacement	Well/Yr	0.20	\$ 5,000.00	\$ 5,000.00	\$ 1,000	3 wells replaced over next 15 years
b.				\$ -	\$ -	
c. RCRA Reports	EA	1	\$ 3,250.00	\$ 3,250.00	\$ 3,250	
d.				\$ -	\$ -	
Subtotal					\$ 4,250	

CECOS International, Inc.

Ohio EPA No. _____

ANNUAL POST-CLOSURE COST BREAKDOWN

VII. Operation & Maintenance - Gas Extraction System						
Activity Item	Unit	Quantity	Base Unit Cost	Current Unit Cost	Subtotal	Additional Comments
a.				\$ -	\$ -	
b.				\$ -	\$ -	
c.				\$ -	\$ -	
d.				\$ -	\$ -	
e.				\$ -	\$ -	
f.				\$ -	\$ -	
g.				\$ -	\$ -	
Subtotal					\$ -	

VIII. Operation & Maintenance - Gas Monitoring System						
Activity Item	Unit	Quantity	Base Unit Cost	Current Unit Cost	Subtotal	Additional Comments
a.				\$ -	\$ -	
b.				\$ -	\$ -	
c.				\$ -	\$ -	
d.				\$ -	\$ -	
e.				\$ -	\$ -	
Subtotal					\$ -	

IX. Utilities for Operation						
Activity Item	Unit	Quantity	Base Unit Cost	Current Unit Cost	Subtotal	Additional Comments
a. Electrical	LS/YR	1	\$ 41,234.40	\$ 41,234.40	\$ 41,234	
b.				\$ -	\$ -	
c.				\$ -	\$ -	
d.				\$ -	\$ -	
Subtotal					\$ 41,234	

X. Maintenance of Cover System						
Activity Item	Unit	Quantity	Base Unit Cost	Current Unit Cost	Subtotal	Additional Comments
a. Mowing	LS	2	\$ 14,317.50	\$ 14,317.50	\$ 28,635	Two times per year - 55 acres
b. Cap Repair	ACRE	5.5	\$ 733.06	\$ 733.06	\$ 4,032	Approx. 5.5 acres per year
c. Reseeding	ACRE	5.5	\$ 687.24	\$ 687.24	\$ 3,780	
d. Daily Inspections	LS/YR	1	\$ 22,621.65	\$ 22,621.65	\$ 22,622	
e. Weekly Inspections	LS/YR	1	\$ 7,531.01	\$ 7,531.01	\$ 7,531	
f. Monthly Inspections	LS/YR	1	\$ 1,145.40	\$ 1,145.40	\$ 1,145	
g.				\$ -	\$ -	
Subtotal					\$ 67,745	

XI. Operation & Maintenance - Surface Water Management System						
Activity Item	Unit	Quantity	Base Unit Cost	Current Unit Cost	Subtotal	Additional Comments
a.				\$ -	\$ -	Inspections & Repairs Included Elsewhere
b.				\$ -	\$ -	
c.				\$ -	\$ -	
d.				\$ -	\$ -	
Subtotal					\$ -	

XII. Operation & Maintenance - Access Control Structures						
Activity Item	Unit	Quantity	Base Unit Cost	Current Unit Cost	Subtotal	Additional Comments
a. Fences, Gates, Signs	LS/YR	1	\$ 1,603.56	\$ 1,603.56	\$ 1,604	
b. Roads	LS/YR	1	\$ 2,290.80	\$ 2,290.80	\$ 2,291	
c.				\$ -	\$ -	
d.				\$ -	\$ -	
Subtotal					\$ 3,894	

**APPENDIX E
BOREHOLE LOGS FOR
DMP GROUNDWATER MONITORING WELLS AND
PIEZOMETERS – ON CD**

Client: CECOS International
 Project: SCMF No. 12
 Project No.: 021-86-389

Page: 1 of 3

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
909.0	0.0	Augered without sampling					
870.0	39.0	Gray sandy clayey silt with gravel	1	39.0-40.0	SS	16-60-41-69	24
			2	41.0-43.0	SS	26-32-38-38	21
			3	43.0-45.0	SS	16-32-30-21	24
			4	45.0-47.0	SS	6-10-15-24	24
863.5	45.5	Gray silty sand					
862.8	46.2	Gray silty sand with gravel (wet)	5	47.0-49.0	SS	11-11-56-86	24
			6	49.0-51.0	SS	12-25-25-71	24
858.2	50.8	Gray sandy silt (wet)	7	51.0-53.0	SS	200/4	4
			8	53.0-55.0	SS	8-11-10-8	19
855.1	53.9	Gray silty sand with gravel					
854.0	55.0	Gray sandy clayey silt (till)	9	55.0-57.0	SS	2-6-8-10	18
853.4	55.6	Gray silty sand grading to gray sand (wet)	10	57.0-59.0	SS	---	15
			11	59.0-61.0	SS	2-5-7-12	18
849.0	60.0	Gray sand with gravel (wet)	12	61.0-63.0	SS	7-12-14-17	22
			13	63.0-65.0	SS	7-14-21-37	24
845.0	64.0	Gray and olive sandy clayey silt with gravel (till)	14	65.0-67.0	SS	6-13-18-20	20

Dates Drilled: 2-14-87

Driller: T. Stewart

Water Depth: Initial:

NOTE: 380-lb. hammer used.

Days after Completion:

Days after Completion:

Drilling Method: 3-1/4" ID Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

Client: CECOS International
 Project: SCMF No. 12
 Project No.: 021-86-389

Page: 2 of 3

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
842.0	67.0	Gray, blue-gray, and olive sandy clayey silt with gravel (till)	15 16 17 18	67.0-69.0 69.0-71.0 71.0-73.0 73.0-75.0	SS SS SS SS	4-8-12-13 2-5-5-8 5-7-7-8 4-5-6-15	20 22 22 20
835.0	74.0	Gray and gray-blue sandy silty clay with gravel (trace of organic material)	19	75.0-77.0	SS	7-15-8-16	22
833.0	76.0	Gray silty sand with gravel					
832.7	76.3	Gray and gray-blue sandy clayey silt with gravel, trace of organic material (till)	20 21	77.0-79.0 79.0-81.0	SS SS	7-10-16-38 2-22-20-12	22 20
828.2	80.8	Gray sandy silt					
827.5	81.5	Gray, blue-gray and brown sandy silty clay with organic material	22 23	81.0-83.0 83.0-85.0	SS SS	6-5-5-6 10-8-8-12	24 18
824.0	85.0	Blue gray sandy silty clay	24	85.0-87.0	SS	4-6-9-12	22
823.0	86.0	Mottled blue-gray and olive sandy silty clay					
822.0	87.0	Blue-gray silty clay with some fine sand	25 26	87.0-89.0 89.0-91.0	SS SS	2-4-5-5 3-4-4-5	24 24
819.0	90.0	Dark brown weathered wood chips					

Dates Drilled: 2-14-87

Driller: T. Stewart

Water Depth: Initial:

NOTE: 380-lb. hammer used.

Days after Completion:

Days after Completion:

Drilling Method: 3-1/4" I.D. Hollow Stem Augers

S&ME, INC.

Cincinnati, Ohio

Client: CECOS International
 Project: SCMF No. 12
 Project No.: 021-86-389

Page: 3 of 3

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
818.9	90.1	Gray-brown sandy silty clay with organic material and disseminated blue and white material					
817.5	91.5	Blue-gray sandy silty clay	27	91.0-93.0	SS	3-4-4-4	22
815.5	93.5		28	91.0-93.6	SS	20-200/1	7
810.0	99.0	Weathered shale and lime- stone (bedrock)	29	93.6-99.0	Core	N/A	5
		Boring terminated @ 99.0'					

Dates Drilled: 2-14-87

Driller: T. Stewart

Water Depth: Initial:

NOTE: 380-lb. hammer used.

Days after Completion:

Days after Completion:

S&ME, INC.

Drilling Method: 3-1/4" ID Hollow Stem Augers

Cincinnati, Ohio

Client: CECOS International
 Project: SCMF No. 12
 Project No.: 021-86-389

Page: 1 of 1

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
908.0	0.0	Augered without sampling					
868.0	40.0	Gray sandy clayey silt with gravel (till)	1	40.0-42.0	SS	15-30-43-55	22
			2	42.0-44.0	SS	29-26-29-30	24
			3	44.0-46.0	SS	20-17-27-24	24
862.8	45.2	Gray silty fine sand grading to silty fine - coarse sand with gravel, wet	4	46.0-48.0	SS	3-15-28-34	24
			5	48.0-50.0	SS	27-36-37-29	20
			6	50.0-52.0	SS	28-72-260	18
			7	52.0-54.0	SS	8-9-9-9	24
		- 3" till @ 50.2'-50.6'					
855.3	52.7	Gray silty fine sand, wet	8	54.0-56.0	SS	1-1-1-3	24
			9	56.0-58.0	SS	1-0-1-0	24
			10	58.0-60.0	SS	2-2-1-3	24
		- 2" seam of gray silt @ 53.5'	11	60.0-62.0	SS	10-14-19-24	24
			12	62.0-64.0	SS	7-9-12-14	24
			13	64.0-66.0	SS	6-7-9-11	18
		- gravel seam 58.5'-60.0'	14	66.0-68.0	SS	1-0-1-0	6
			15	68.0-70.0	SS	2-3-3-1	8
			16	70.0-72.0	SS	1-1-1-1	6
		- gravel 62.0'-62.7'	17	72.0-74.0	SS	1-1-3-4	7
			18	74.0-76.0	SS	6-15-15-15	24
			19	76.0-78.0	SS	6-15-20-19	18
831.0	77.0	Gray sandy clayey silt with gravel (till)	20	79.0-81.0	SS	6-15-25-15	24
827.0	81.0	Boring terminated @ 81.0'					

Dates Drilled:

Driller: E. Dye

Water Depth: Initial:

NOTE: 380-lb. hammer used

Days after Completion:

Days after Completion:

Drilling Method: 3-1/4" ID Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

Client: CECOS International
 Project: SCMF #12 Boring Program
 Project No.: 021-86-386

Page:1 of 3

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
909.5	0.0	Mottled gray and brown silty clay with gravel (trace of organic material)	1	0.0-2.0	SS	1-3-3-3	17
			2	2.0-4.0	SS	4-6-6-5	18
905.5	4.0	Gray clayey silt with sand	3	4.0-5.0	SS	4-3-3-2	24
904.3	5.2	Mottled gray and brown sandy silty clay with gravel, trace of organic Material (till)	4	6.0-8.0	SS	5-4-6-6	21
901.1	8.4	Brown sandy clayey silt with gravel (till)	5	8.0-10.0	SS	2-3-3-4	24
			6	10.0-12.0	SS	5-11-16-23	18
			7	12.0-14.0	SS	22-22-26-27	19
894.3	15.2	Brown silty sand with fine gravel, moist	8	14.0-16.0	SS	17-20-28-32	19
893.5	16.0	Gray sandy clayey silt with gravel (till)	9	16.0-18.0	SS	6-8-13-13	19
			10	18.0-20.0	SS	4-6-11-15	23
			11	20.0-22.0	SS	5-12-17-20	24
			12	22.0-24.0	SS	12-14-18-21	24
			13	24.0-26.0	SS	11-11-14-15	24
			14	26.0-28.0	SS	7-8-13-16	21
			15	28.0-30.0	SS	12-16-19-23	24
879.5	30.0	Gray sand with gravel, wet	16	30.0-32.0	SS	11-12-10-13	16
			17	32.0-34.0	SS	10-12-13-14	24
			18	34.0-36.0	SS	7-12-13-14	16
			19	36.0-38.0	SS	5-6-11-16	15

Dates Drilled: 2-4/5-87

Driller: F. Moore

Water Depth: Initial: None

Note: 300 lb. hammer used

Drilling Method: 3-1/4" I.D. Hollow Stem Augers

S&ME, INC.
 Cincinnati, Ohio

Client: CECOS International
 Project: SCMF #12 Boring Program
 Project No.: 021-86-386

Page:2 of 3

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
871.5	38.0	Gray sandy clayey silt with gravel (till)	20	38.0-40.0	SS	12-22-26-30	16
			21	40.0-42.0	SS	8-13-19-25	24
			22	42.0-44.0	SS	12-13-34-37	22
			23	44.0-46.0	SS	10-21-29-44	24
			24	46.0-48.0	SS	13-15-29-31	23
			25	48.0-50.0	SS	18-26-42-41	24
			26	50.0-52.0	SS	13-18-30-36	20
			27	52.0-54.0	SS	17-26-35-72	24
			28	54.0-56.0	SS	15-25-43-52	24
			29	56.0-58.0	SS	19-25-29-42	20
			30	58.0-60.0	SS	17-26-31-46	24
			31	60.0-62.0	SS	15-17-43-46	24
			32	62.0-64.0	SS	18-19-26-29	24
844.0	65.5	Gray and brown sandy silt with gravel (till)	33	64.0-66.0	SS	18-23-43-48	24
			34	66.0-68.0	SS	17-26-24-26	18
841.7	67.8	Gray and brown sandy clayey silt with gravel (till)	35	68.0-70.0	SS	20-23-26-32	15
			36	70.0-72.0	SS	15-16-26-29	24
			37	72.0-74.0	SS	13-15-18-26	24
835.5	74.0	Gray sandy clayey silt with gravel (till)	38	74.0-76.0	SS	7-8-12-16	21
			39	76.0-78.0	SS	8-10-10-12	24
			40	78.0-80.0	SSs	11-23-26-28	8
829.5	80.0	Gray silty clay with trace of fine gravel (organic odor) grading to	41	80.0-82.0	SS	4-5-7-9	24
			42	82.0-84.0	SS	4-6-5-7	8
824.5	85.0	Blue-gray silty clay with gravel	43	84.0-86.0	SS	6-9-9-7	24

Dates Drilled: 2-4/5-87

Driller: F. Moore

Water Depth: Initial: None

Note: 300 lb. hammer used

Drilling Method: 3-1/4" I.D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

Client: CECOS International
Project: SCMF #12 Boring Program
Project No.: 021-86-386

Page:3 of 3

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
822.2	87.3	Blue-gray weathered shale with trace limestone (bedrock)	44	86.0-87.8	SS	9-12-15-145/3"	18
821.7	87.8	Boring terminated @ 87.8'					

Dates Drilled: 2-4/5-87
Water Depth: Initial: None

Driller: F. Moore
Note: 300 lb. hammer used

Drilling Method: 3-1/4" I.D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. 12-4

WELL LOCATION SCMF No. 12 SURFACE ELEVATION 909.5

DATE INSTALLED 2-5-87 TOP OF CSG. ELEVATION 911.98

TYPE OF WELL 1" Porous Screen with 3/4" Riser Pipe

DATE	WATER SURFACE DEPTH (FT.) *	WATER SURFACE ELEV. (FT.)	INSTALLATION	DESCRIPTION
				<div style="display: flex; justify-content: space-between;"> <div>DESCRIPTION</div> <div>DEPTH (FT.)</div> </div> <div style="display: flex; justify-content: space-between;"> <div> <p>2.5</p> <p>0.0</p> <p>Grout</p> <p>65.0</p> <p>Bentonite</p> <p>80.0</p> <p>85.0</p> <p>Screen</p> <p>87.0</p> <p>87.8</p> </div> <div> <p>2.5</p> <p>0.0</p> <p>Grout</p> <p>65.0</p> <p>Bentonite</p> <p>80.0</p> <p>85.0</p> <p>Sand Pack</p> <p>87.0</p> <p>87.8</p> </div> </div>

JOB NUMBER 1221-87-389-1.2

OWNER CECOS International

SOIL & MATERIAL ENGINEERS, INC.

225 CORPORATE COURT
FAIRFIELD, OHIO 45042

874-4111

*REFERENCE Top of 3/4" Pipe

Client: CECOS International
 Project: SCMF #12 Boring Program
 Project No.: 021-86-386

Page:1 of 3

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
907.6	0.0	Mottled brown sandy silty clay	1	0.0-2.0	SS	2-2-3-5	24
			2	2.0-4.0	SS	2-2-2-4	18
			3	4.0-6.0	SS	2-2-3-5	11
			4	6.0-8.0	SS	2-3-4-4	19
899.1	8.5	Mottled gray and brown sandy clayey silt with gravel (till)	5	8.0-10.0	SS	1-5-9-14	24
			6	10.0-12.0	SS	5-13-19-20	24
			7	12.0-14.0	SS	9-11-15-16	24
			8	14.0-16.0	SS	9-14-18-20	24
			9	16.0-18.0	SS	13-13-18-26	24
			10	18.0-20.0	SS	9-13-18-20	23
			11	20.0-22.0	SS	8-9-12-14	24
			12	22.0-24.0	SS	7-10-14-15	24
			13	24.0-26.0	SS	9-14-15-15	23
			14	26.0-28.0	SS	14-16-18-18	18
			15	28.0-30.0	SS	20-26-37-42	24
			16	30.0-32.0	SS	21-29-42-53	24
			17	32.0-34.0	SS	15-18-28-30	24
			18	34.0-36.0	SS	13-20-22-29	24
			19	36.0-38.0	SS	15-32-62-64	24
			20	38.0-40.0	SS	20-29-53-78	21
			21	40.0-42.0	SS	14-32-36-42	24
			22	42.0-44.0	SS	19-31-42-88	24
			23	44.0-46.0	SS	Drop-27-54-74	24
			24	46.0-48.0	SS	Drop-17-21-29	24
			25	48.0-50.0	SS	Drop-97-101-86	24
			26	50.0-52.0	SS	15-23-29-30	24
			27	52.0-54.0	SS	16-30-44-52	18
			28	54.0-56.0	SS	13-21-25-31	24
850.8	56.8	Gray sandy clayey silt with fine-coarse gravel (till)	29	56.0-58.0	SS	13-48-20-25	20

Dates Drilled: 2-4/5-87

Driller: F. Moore

Water Depth: Initial: None

Note: 300 lb. hammer used

Drilling Method: 3-1/4" I.D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

RECORD OF BORING NO. 12-5

Client: CECOS International
 Project: SCMF #12 Boring Program
 Project No.: 021-86-386

Page:2 of 3

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
847.6	60.0	Gray clayey silt with gravel and sand (till)	30 31 32	58.0-60.0 60.0-62.0 62.0-64.0	SS SS SS	11-16-31-42 17-100/3" 15-34-44-51	24 9 24
844.0	63.6	Mottled gray and brown sandy clayey silt with gravel (till)					
842.0	65.0	Brown sandy clayey silt, with gravel (till)	33	64.0-66.0	SS	25-38-81-136	24
841.6	66.0	Brown silty fine sand with gravel, wet	34 35	66.0-68.0 68.0-70.0	SS SS	N/A 45-65-73-96	24 16
837.2	70.4	Brown silty sand, moist	36	70.0-72.0	SS	20-22-16-28	24
835.8	71.8	Gray sandy clayey silt with gravel (till)	37	72.0-74.0	SS	11-12-15-25	24
833.1	74.5	Gray sandy clayey silt with gravel (till)	38 39 40 41 42 43	74.0-76.0 76.0-78.0 78.0-80.0 80.0-82.0 82.0-84.0 84.0-86.0	SS SS SS SS SS SS	5-8-13-12 9-13-14-18 6-46-36-18 4-6-9-13 4-8-12-25 10-14-16-22	24 24 24 24 20 24
820.0	87.6	Gray sandy clayey silt with gravel grading to gray sandy silt @ 88.7'	44 45	86.0-88.0 88.0-90.0	SS SS	6-8-8-14 7-9-11-18	20 24
817.6	90.0	Green silt	46	90.0-92.0	SS	10-14-15-17	22

Dates Drilled: 2-4/5-87

Driller: F. Moore

Water Depth: Initial: None

Note: 300 lb. hammer used

Drilling Method: 3-1/4" I. D. Hollow Stem Augers

S&ME, INC.
 Cincinnati, Ohio

RECORD OF BORING NO. 12-5

Client: CECOS International
Project: SCMF #12 Boring Program
Project No.: 021-86-386

Page:3 of 3

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
815.9	91.7	Green silt, laminated, wet	47	92.0-94.0	SS	10-11-9-9	23
			48	94.0-96.0	SS	7-6-6-6	18
811.3	96.3	Greenish-gray silt with medium - coarse gravel	49	96.0-97.0	SS	10-136	12
810.6	97.0	Boring terminated @ 97.0'					

Dates Drilled: 2-4/5-87
Water Depth: Initial: None

Driller: F. Moore
Note: 300 lb. hammer used

Drilling Method: 3-1/4" I.D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

RECORD OF BORING NO. 12-6

Client: CECOS International
 Project: SCMF #12 Boring Program
 Project No.: 021-86-386

Page:1 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
911.6	0.0	Gray sandy clayey silt with gravel (stockpile material)	1	0.0-2.0	SS	24-17-21-28	18
			2	2.0-4.0	SS	18-14-12-10	24
907.8	3.8	Mottled brown and gray sandy silty clay	3	4.0-6.0	SS	2-3-3-4	12
			4	6.0-8.0	SS	2-3-3-4	24
			5	8.0-10.0	SS	2-1-2-3	24
			6	10.0-12.0	SS	1-2-2-3	22
900.0	11.6	Brown silty fine sand with gravel, dry	7	12.0-14.0	SS	5-10-15-18	24
			8	14.0-16.0	SS	11-22-25-31	24
895.8	15.8	Brown and gray sandy clayey silt with gravel (till)	9	16.0-18.0	SS	9-12-15-16	24
			10	18.0-20.0	SS	9-11-12-16	24
			11	20.0-22.0	SS	9-10-12-16	24
			12	22.0-24.0	SS	3-9-12-12	24
			13	24.0-26.0	SS	4-5-10-13	24
			14	26.0-28.0	SS	6-7-9-8	24
883.2	28.4						
		Gray sand with gravel and silt, dry	15	28.0-30.0	SS	8-8-17-21	22
			16	30.0-32.0	SS	36-34-31-34	22
879.6	32.0	Gray sandy clayey silt with gravel (till)	17	32.0-34.0	SS	9-9-11-12	14
			18	34.0-36.0	SS	3-5-4-5	18
			19	36.0-38.0	SS	7-10-9-18	5
873.9	37.7	Gray silty fine sand, dry	20	38.0-40.0	SS	7-9-10-18	24

Dates Drilled: 2-4/5-87

Driller: F. Moore

Water Depth: Initial: None

NOTE: 300-lb. hammer used

Drilling Method: 3-1/4" I. D. Hollow Stem Augers

S&ME, INC.
 Cincinnati, Ohio

RECORD OF BORING NO. 12-6

Client: CECOS International
 Project: SCMF #12 Boring Program
 Project No.: 021-86-386

Page:2 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
873.4	38.2	Gray sandy, clayey silt with gravel (till)	21	40.0-42.0	SS	20-22-25-36	24
			22	42.0-44.0	SS	18-22-41-38	24
			23	44.0-46.0	SS	21-22-36-58	24
			24	46.0-48.0	SS	31-33-46-51	24
			25	48.0-50.0	SS	28-31-51-68	24
			26	50.0-52.0	SS	19-21-23-38	24
			27	52.0-54.0	SS	22-30-42-48	24
			28	54.0-56.0	SS	17-18-24-32	24
			29	56.0-58.0	SS	12-14-23-28	24
			30	58.0-60.0	SS	20-24-25-28	24
			31	60.0-62.0	SS	12-17-19-20	24
			32	62.0-64.0	SS	17-19-26-30	24
			33	64.0-66.0	SS	15-17-20-24	24
845.6	66.0	Gray silty sand, trace of fine gravel	34	66.0-68.0	SS	9-9-11-16	24
841.9	69.7		35	68.0-70.0	SS	12-10-19-20	24
		Gray sandy clayey silt, with gravel (till)	36	70.0-72.0	SS	Drop-57-114	21
			37	72.0-74.0	SS	115/5"	5
837.6	74.0	Gray weathered shale with limestone	38	74.0-75.0	SS	100/2"	2
			39	75.0-76.0	SS	78-112	12
835.6	76.0	Boring terminated @ 76.0'					

Dates Drilled: 2-4/5-87
 Water Depth: Initial: None

Driller: F. Moore
 Note: 300 lb. hammer used

Drilling Method: 3-1/4" I. D. Hollow Stem Augers

S&ME, INC.
 Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. 12-6

WELL LOCATION SCMF No. 12 SURFACE ELEVATION 911.41

DATE INSTALLED _____ TOP OF CSG. ELEVATION 914.92

TYPE OF WELL 1" Porous Stone with 3/4" Riser Pipe

DATE	WATER SURFACE DEPTH (FT.) *	WATER SURFACE ELEV. (FT.)	INSTALLATION	DESCRIPTION
			DESCRIPTION	DEPTH (FT.)
				<div> <div>3.5</div> <div>0.0</div> <div>Grout</div> <div>57.0</div> <div>Bentonite</div> <div>63.0</div> <div>72.0</div> <div>Screen</div> <div>74.0</div> <div>Sand Pack</div> <div>75.0</div> </div>

JOB NUMBER _____

OWNER _____

* REFERENCE _____

SOIL & MATERIAL ENGINEERS, INC.

225 CORPORATE COURT

FAIRFIELD, OHIO 45042

874-4111

Client: CECOS International
 Project: SCMF No. 13
 Project No.: 1221-87-136

Page: 1 of 3

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
912.4	0.0	Brown sandy silt with gravel (fill)	1	0.0-2.0	SS	3-7-11-10	12
			2	2.0-4.0	SS	8-8-17-17	12
908.4	4.0	Mottled brown and gray sandy clayey silt with organics material (fill)	3	4.0-6.0	SS	4-6-5-9	15
			4	6.0-8.0	SS	2-4-6-8	18
			5	8.0-10.0	SS	3-6-6-11	24
			6	10.0-12.0	SS	6-13-15-21	19
901.7	10.7	Mottled brown and gray very sandy clayey silt with gravel (till)	7	12.0-14.0	SS	5-16-23-50	24
			8	14.0-16.0	SS	10-42-200/6	18
896.4	16.0	Gray sandy clayey silt with gravel (till)	9	16.0-18.0	SS	28-31-32-38	24
			10	18.0-20.0	SS	25-30-25-27	24
			11	20.0-22.0	SS	27-44-47-55	24
891.1	21.3	Brown sand with gravel, moist, dense					
890.6	21.8	Brown sandy clayey silt with gravel (till)	12	22.0-24.0	SS	10-16-17-24	24
888.4	24.0	Gray sandy clayey silt with gravel (till)	13	24.0-26.0	SS	20-34-55-66	24
887.8	24.6	Brown silty sand, moist, dense					
887.0	25.4	Gray sandy silty clay with gravel (till)	14	26.0-28.0	SS	59-48-60-80	19
			15	28.0-30.0	SS	12-20-26-20	24
			16	30.0-32.0	SS	15-20-23-25	24

Dates Drilled: 2-14,16-87

Driller: E. Dye

Water Depth: Initial:

Note: 380-lb. hammer used

Days after Completion:

Days after Completion:

S&ME, INC.

Drilling Method: 3-1/4" ID Hollow Stem Augers

Cincinnati, Ohio

RECORD OF BORING NO. 13-5

Client: CECOS International
 Project: SCMF No. 13
 Project No.: 1221-87-136

Page: 2 of 3

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
			17	32.0-34.0	SS	7-14-15-20	24
			18	34.0-36.0	SS	7-10-9-11	24
			19	36.0-38.0	SS	10-13-15-18	24
			20	38.0-40.0	SS	10-15-16-20	24
			21	40.0-42.0	SS	10-20-23-25	24
			22	42.0-44.0	SS	7-4-10-11	8
			23	44.0-46.0	SS	6-14-14-22	24
			24	46.0-48.0	SS	9-10-14-17	24
			25	48.0-50.0	SS	8-11-15-19	24
			26	50.0-52.0	SS	9-9-9-13	22
			27	52.0-54.0	SS	5-7-7-8	24
			28	54.0-56.0	SS	5-6-8-8	24
			29	56.0-58.0	SS	6-7-8-18	21
855.2	57.2	Gray sand and gravel, wet	30	58.0-60.0	SS	9-11-14-60	24
852.8	59.6	Gray silty clay with gravel (till)					
852.4	60.0	Gray sandy silt with gravel (till)	31	60.0-62.0	SS	47-50-52-87	18
			32	62.0-64.0	SS	6-10-21-34	16
			33	64.0-66.0	SS	17-24-35-50	19
			34	66.0-68.0	SS	6-7-9-31	13
845.4	67.0	Gray coarse sand and gravel, wet	35	68.0-70.0	SS	19-23-25-39	8
			36	70.0-72.0	SS	12-20-28-34	24
			37	72.0-74.0	SS	7-9-10-12	22
			38	74.0-76.0	SS	7-9-11-17	7
			39	76.0-78.0	SS	6-6-5-7	24
			40	78.0-80.0	SS	6-8-7-10	17
832.6	79.8	Gray sandy silty clay with gravel and organic material (till)	41	80.0-82.0	SS	4-6-8-15	18
			42	82.0-84.0	SS	5-8-12-15	24
			43	84.0-86.0	SS	5-4-8-8	24
			44	86.0-88.0	SS	3-3-6-9	20

Dates Drilled: 2-14,16-87

Driller: E. Dye

Water Depth: Initial:

NOTE: 380-lb. hammer used

Days after Completion:

Days after Completion:

Drilling Method: 3-1/4" ID Hollow Stem Augers

S&ME, INC.
 Cincinnati, Ohio

RECORD OF BORING NO. 13-5

Client: CECOS International
Project: SCMF No. 13
Project No.: 1221-87-136

Page: 3 of 3

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
		- 2" seam of coarse sand @ 85.0'	45	88.0-90.0	SS	3-3-4-6	19
			46	90.0-92.0	SS	7-8-10-18	24
			47	92.0-94.0	SS	10-11-9-14	19
			48	94.0-96.0	SS	6-8-51- 200/2	20
816.9	95.5	Gray weathered shale and limestone (bedrock)	49	95.5-101.5	NX		
810.9	101.5	Boring terminated @ 101.5'					

Dates Drilled: 2-14,16-87

Driller: E. Dye

Water Depth: Initial:

NOTE: 380-lb. hammer used

Days after Completion:

Days after Completion:

Drilling Method: 3-1/4" ID Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. 13-5

WELL LOCATION SCMF No. 13

SURFACE ELEVATION 912.4

DATE INSTALLED 2-16-87

TOP OF CSG. ELEVATION 914.92

TYPE OF WELL 2' Porous Stone

DATE	WATER SURFACE DEPTH (FT.) *	WATER SURFACE ELEV. (FT.)	INSTALLATION	DESCRIPTION
2-16-87				<div style="display: flex; justify-content: space-between;"> <div> <p>DESCRIPTION</p> <p>DEPTH (FT.)</p> <p>2.5</p> <p>0.0</p> <p>Grout</p> <p>91.5</p> <p>Bentonite Seal</p> <p>93.0</p> <p>94.5</p> <p>Porous Stone</p> <p>96.5</p> <p>98.0</p> <p>Bentonite</p> <p>100.5</p> <p>Sand Pack</p> </div> </div>

JOB NUMBER 1221-87-136
 OWNER CECOS International

SOIL & MATERIAL ENGINEERS, INC.

225 CORPORATE COURT
 FAIRFIELD, OHIO 45042
 874-4111

*REFERENCE Top of 3/4" Pipe

Also w-1

RECORD OF BORING NO. 13-12

Client: CECOS International
 Project: SCMF #13
 Project No.: 1221-87-136-1.2

Page: 1 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
910.8	0.0	Gray clayey silt with organic material	1	0.0-2.0	SS	1-1-1-1	20
909.8	1.0	Mottled brown and gray clayey silt with organic material	2	2.0-4.0	SS	3-6-7-9	24
			3	4.0-6.0	SS	3-11-12-11	24
			4	6.0-8.0	SS	14-14-16-19	24
902.3	8.5	Mottled brown and gray sandy clayey silt	5	8.0-10.0	SS	14-14-12-14	18
901.7	9.1	Brown and gray sandy clayey silt with gravel (till)	6	10.0-12.0	SS	3-6-17-18	24
			7	12.0-14.0	SS	27-36-41-52	24
			8	14.0-16.0	SS	32-36-33-32	24
			9	16.0-18.0	SS	4-22-27-27	20
			10	18.0-20.0	SS	24-29-53-61	13
			11	20.0-22.0	SS	14-12-16-19	24
889.2	21.6	Gray silty fine-coarse sand with gravel	12	22.0-24.0	SS	16-27-34-40	24
886.5	24.3	Gray sandy clayey silt with gravel (till)	13	24.0-26.0	SS	21-20-19-16	24
			14	26.0-28.0	SS	11-12-13-15	24
			15	28.0-30.0	SS	13-20-23-31	16
			16	30.0-32.0	SS	9-10-12-16	24
			17	32.0-34.0	SS	22-22-20-19	24
			18	34.0-36.0	SS	10-22-18-15	20
			19	36.0-38.0	SS	7-10-14-17	24
			20	38.0-40.0	SS	22-26-24-22	24
			21	40.0-42.0	SS	9-10-8-11	24
			22	42.0-44.0	SS	12-11-13-16	16
		Gray sandy clayey silt with fine-coarse gravel and occasional cobble	23	44.0-46.0	SS	10-9-10-12	24
			24	46.0-48.0	SS	3-4-6-9	17
			25	48.0-50.0	SS	19-12-14-27	24

Dates Drilled: 3-7 & 3-8-87

Driller: B. Gollihue

Water Depth: Initial: 35'

NOTE: 380-lb. hammer used

Days after Completion:

Days after Completion:

Drilling Method: 3-1/4" I. D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

RECORD OF BORING NO. 13-12

Client: CECOS International
 Project: SCMF #13 Design
 Project No.: 1221-87-136-1.2

Page: 2 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
861.1	49.7	Gray silty fine-coarse sand and gravel (wet)	26	50.0-52.0	SS	2-2-9-12	24
		(4" gray till 50.0'-50.3')	27	52.0-54.0	SS	21-13-14-17	24
		(3" gray till 50.3'-50.8')	28	54.0-56.0	SS	4-12-20-16	24
		(Very fine clean sand 50.8'-51.3')	29	56.0-58.0	SS	12-14-19-18	24
		(51.3'-51.8')	30	58.0-60.0	SS	4-8-8-8	24
		(51.8'-52.3')	31	60.0-62.0	SS	9-12-10-12	24
		(52.3'-52.8')	32	62.0-64.0	SS	5-11-12-9	24
		(fine-coarse gravel 52.8'-53.3')	33	64.0-66.0	SS	7-7-11-17	24
		(53.3'-53.8')	34	66.0-68.0	SS	10-63-44-34	
			35	68.0-70.0	SS	7-11-41-17	24
841.6	69.2	Gray sandy clayey silt with fine-coarse gravel (till) with cobbles					
840.6	70.2	Gray silty fine-coarse sand and gravel	36	70.0-72.0	SS	16-10-7-7	24
839.1	71.7	Gray sandy clayey silt with fine-coarse gravel (till)	37	72.0-74.0	SS	4-2-2-3	
837.2	73.6	Gray silty clay					
836.8	74.0	Boring terminated @ 74.0'					

Dates Drilled: 3-7 & 3-8-87

Driller: B.Gollihue

Water Depth: Initial:

NOTE: 380-lb. hammer used

Days after Completion:

Days after Completion:

Drilling Method: 3-1/4" I. D. Hollow Stem Augers

S&ME, INC.
 Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. 13-12

also w-1

WELL LOCATION White Property

SURFACE ELEVATION 910.8

DATE INSTALLED 3-8-87

TOP OF CSG. ELEVATION 914.06

TYPE OF WELL 2" Dia Schedule 40 PVC Pipe, Flush Threaded, with .010" Slot Screen

DATE	WATER SURFACE DEPTH (FT.) *	WATER SURFACE ELEV. (FT.)	INSTALLATION	DESCRIPTION
				<div> <div>DESCRIPTION</div> <div>DEPTH (FT.)</div> <div> <div>3.3</div> <div>0.0</div> <div>Grout</div> <div>44.0</div> <div>Bentonite</div> <div>61.5</div> <div>64.0</div> <div>Screen</div> <div>69.0</div> <div>72.0</div> <div>Bentonite</div> <div>74.0</div> <div>Sand Pack</div> </div> </div>

JOB NUMBER 1221-87-136-1.2

OWNER CECOS International

*REFERENCE Top of Casing

SOIL & MATERIAL ENGINEERS, INC.

225 CORPORATE COURT
FAIRFIELD, OHIO 45042
874-4111

RECORD OF BORING NO.

14-1

Client: CECOS International

Page: 1 of 2

Project: SCMF No. 14 Boring Program

Project No.: 021-86-386

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
915.07	0.0	Slightly mottled gray and brown sandy clayey silt with gravel	1	0.0-2.0	SS	12-18-15-11	20
			2	2.0-4.0	SS	9-7-6-6	22
			3	4.0-6.0	SS	3-2-3-4	20
			4	6.0-8.0	SS	1-3-3-4	24
			5	8.0-10.0	SS	2-6-7-8	23
905.97	9.1	Mottled brown and gray silty clay	6	10.0-12.0	SS	1-2-2-3	24
904.27	10.8	Mottled brown and gray silty clay with sand	7	12.0-14.0	SS	3-2-3-3	24
			8	14.0-16.0	SS	1-5-7-16	24
900.57	14.5	Mottled brown sandy clayey silt with gravel					
899.07	16.0		9	16.0-18.0	SS	12-20-27-45	24
897.27	17.8	Gray silty gravelly sand					
896.67	18.4		10	18.0-20.0	SS	13-27-24-26	15
			11	20.0-22.0	SS	16-12-19-27	24
			12	22.0-24.0	SS	13-16-19-23	24
			13	24.0-26.0	SS	9-15-13-16	23
			14	26.0-28.0	SS	8-12-15-16	24
			15	28.0-30.0	SS	8-9-13-15	24
			16	30.0-32.0	SS	10-14-20-45	16
883.37	31.7		17	32.0-34.0	SS	20-48-50-90	21
879.47	35.6		18	34.0-36.0	SS	44-44-33-24	22
		Gray sandy clayey silt with gravel	19	36.0-38.0	SS	15-14-13-16	24
			20	38.0-40.0	SS	13-18-25-29	24
			21	40.0-42.0	SS	9-15-21-32	19

Dates Drilled: 1/6-9/1987

Driller: F. Moore

Water Depth: Initial:

Note: 300 lb. Hammer Used

Days after Completion:

Days after Completion:

Drilling Method: 3 1/4" I.D. Hollow Stem Augers

SOIL & MATERIAL ENGINEERS, INC.
Cincinnati, Ohio

RECORD OF BORING NO.

14-1

Client: CECOS International
 Project: SCMF No. 14 Boring Project
 Project No.: 021-86-386

Page: 2 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
873.07	42.0	Gray sandy clayey silt	22	42.0-44.0	SS	9-11-14-19	24
			23	44.0-46.0	SS	9-12-11-16	23
			24	46.0-48.0	SS	7-13-12-19	24
			25	48.0-50.0	SS	7-10-12-16	18
			26	50.0-52.0	SS	6-8-9-11	20
			27	52.0-54.0	SS	6-8-11-14	20
		Cobble @ 56.0'	28	54.0-56.0	SS	15-36-36-40	6
			29	56.0-58.0	SS	175	0
			30	58.0-60.0	SS	200	5
855.37	59.7	Gray silty sand with gravel	31	60.0-62.0	SS	12-16-18-22	22
			32	62.0-64.0	SS	9-11-9-16	12
			33	64.0-66.0	SS	15-17-17-20	23
			34	66.0-68.0	SS	13-12-30-12	16
			35	68.0-70.0	SS	37-58-91-87	16
845.27	69.8	Gray sandy clayey silt with gravel	36	70.0-72.0	SS	37-58-91-87	23
844.67	70.4	Gray silty clayey sand with gravel, clasts of sandy clayey silt	37	72.0-74.0	SS	30-50-72-106	19
841.17	73.9	Olive-gray sandy clayey silt with gravel	38	74.0-75.5	SS	16-36-146	19
839.77	75.3	Gray weathered shale and limestone					
839.57	75.5	Alternating beds of gray limestone and gray shale, beds vary from .1" to 6" thick		76.0-81.0	NX		98%
834.57	80.5	Boring terminated @ 81.0'					

Dates Drilled: 1/6-9/1987

Driller: F. Moore

Water Depth: Initial:

Note: 300 lb. Hammer Used

Days after Completion:

Days after Completion:

Drilling Method: 3 1/4" I.D. Hollow Stem Augers

SOIL & MATERIAL ENGINEERS, INC.
 Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. 14-1

WELL LOCATION SCMF No. 14 SURFACE ELEVATION 915.2

DATE INSTALLED 1-14-87 TOP OF CSG. ELEVATION 917.32

TYPE OF WELL 1" Porous Stone with 3/4" Riser Pipe

DATE	WATER SURFACE DEPTH (FT.)*	WATER SURFACE ELEV. (FT.)	INSTALLATION	DESCRIPTION
				<div> <div>DESCRIPTION</div> <div>DEPTH (FT.)</div> <div> <div> 2.1 0.0 Grout Bentonite 69.0 73.7 Screen 75.7 76.2 Bentonite 76.8 Natural Material 81.0 Sand Pack </div> </div> </div>

JOB NUMBER 1221-87-136-1.2
OWNER CECOS International

*REFERENCE Top of 3/4" Pipe

SOIL & MATERIAL ENGINEERS, INC.

225 CORPORATE COURT
FAIRFIELD, OHIO 45042
874-4111

Client: CECOS International
 Project: SCMF No. 14
 Project No.: 021-86-389

Page: 1 of 3

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
919.1	0.0	Mottled brown and gray clay (clay stockpile)	1	0.0-2.0	SS	0-3-2-3	16
			2	2.0-4.0	SS	1-2-1-3	17
			3	4.0-6.0	SS	3-2-1-2	9
			4	6.0-8.0	SS	1-1-2-1	16
			5	8.0-10.0	SS	2-1-1-2	16
911.1	8.0	Mottled brown and gray silty clay	6	10.0-12.0	SS	1-2-3-3	14
			7	12.0-14.0	SS	3-5-5-5	19
			8	14.0-16.0	SS	3-2-3-4	20
			9	16.0-18.0	SS	2-3-3-2	15
			10	18.0-20.0	SS	10-18-21-26	17
900.0	19.1	Light brown fine - medium sand					
899.6	19.5	Brown sandy clayey silt with gravel (till)	11	20.0-22.0	SS	25-30-50-90	23
			12	22.0-24.0	SS	50-67-100-90	22
895.8	23.3	Gray sandy clayey silt with gravel (till)	13	24.0-26.0	SS	63-87-100- 112	24
			14	26.0-28.0	SS	45-50-73-88	24
			15	28.0-30.0	SS	27-36-47-55	24
			16	30.0-32.0	SS	90-135-200/6	18
			17	32.0-34.0	SS	96-196-200- 235	24
886.9	32.2	Gray fine - medium sand with gravel					
886.0	33.1	Gray sandy silt with gravel (till)	18	34.0-36.0	SS	91-96-100- 143	24
			19	36.0-38.0	SS	85-99-200/6	12
			20	38.0-40.0	SS	30-73-91-93	24
			21	40.0-42.0	SS	57-73-69-71	24
			22	42.0-44.0	SS	29-47-50-80	24

Dates Drilled: 2-21,22-87

Driller: E. Dye

Water Depth: Initial:

NOTE: 380-lb. hammer used

Days after Completion:

Days after Completion:

Drilling Method: 3-1/4" I. D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

RECORD OF BORING NO. 14-3

Client: CECOS International
 Project: SCMF No. 14
 Project No.: 021-86-389

Page: 2 of 3

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
875.1	44.0	Gray coarse sand grading to clayey fine sand	23	44.0-46.0	SS	135-145-179- 200	24
873.7	45.4		24	46.0-48.0	SS	---	24
		Gray sandy silt with gravel (till)	25	48.0-50.0	SS	22-50-144- 214	24
			26	50.0-52.0	SS	25-30-70-100	24
		- 2" sand seam @ 49.2'	27	52.0-54.0	SS	35-46-47-70	24
			28	54.0-56.0	SS	35-50-85	24
			29	56.0-58.0	SS	49-53-53-60	24
			30	58.0-60.0	SS	40-75-51-76	24
			31	60.0-62.0	SS	29-39-50-80	22
			32	62.0-64.0	SS	43-43-56-107	23
			33	64.0-66.0	SS	37-47-55-71	24
			34	66.0-68.0	SS	14-24-43-47	21
			35	68.0-70.0	SS	20-30-43-60	21
			36	70.0-72.0	SS	23-26-29-45	24
			37	72.0-74.0	SS	35-43-50-100	23
			38	74.0-76.0	SS	24-29-33-71	24
			39	76.0-78.0	SS	200/6	6
			40	78.0-80.0	SS	21-50-47-70	17
			41	80.0-82.0	SS	22-43-44-100	21
837.3	81.8	Gray coarse sand with gravel, wet	42	82.0-84.0	SS	31-47-47-50	24
836.0	83.1						
		Greenish gray sandy silt with gravel (till)					
835.1	84.0						
		Gray coarse sand with gravel (wet)	43	84.0-86.0	SS	19-29-29-49	24

Dates Drilled: 2-21,22-87

Driller: E. Dye

Water Depth: Initial:

NOTE: 380-lb. hammer used

Days after Completion:

Days after Completion:

Drilling Method: 3-1/4" I. D. Hollow Stem Augers

S&ME, INC.
 Cincinnati, Ohio

RECORD OF BORING NO. 14-3

Client: CECOS International
 Project: SCMF No. 14
 Project No.: 021-86-389

Page: 3 of 3

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
834.2	84.9						
		Gray sandy silt with gravel (till)	44	86.0-88.0	SS	32-41-50-52	5
			45	88.0-90.0	SS	11-20-24-30	24
829.1	90.0						
		Greenish gray silt with trace of fine gravel	46	90.0-92.0	SS	18-20-41-51	21
			47	92.0-94.0	SS	11-12-14-16	15
			48	94.0-96.0	SS	7-10-11-12	18
		- 2" sand seam @ 97.0'	49	96.0-98.0	SS	7-16-18-17	18
			50	98.0-100.0	SS	5-5-10-12	21
			51	100.0-102.0	SS	8-10-12-10	24
			52	102.0-104.0	SS	9-11-12-14	20
			53	104.0-106.0	SS	7-12-12-17	24
			54	106.0-108.0	SS	17-18-19-19	24
811.6	107.5						
		Dark brown-black silt with organic material and weathered shale					
811.2	107.9						
		Gray silt	55	108.0-110.0	SS	10-10-11-13	19
		- disseminated blue material @ 109.8'	56	110.0-112.0	SS	40-200/6	8
		- Black and sandy 109.8'-110.0'					
808.4	110.7						
		Gray shale and limestone fragments					
807.1	112.0						
		Interbedded gray shale and limestone	57	112.0-117.0	NX		72
802.1	117.0						
		Boring terminated @ 117.0'					

Dates Drilled: 2-21,22-87

Driller: E. Dye

Water Depth: Initial:

NOTE: 380-lb. hammer used

Days after Completion:

Days after Completion:

S&ME, INC.

Drilling Method: 3-1/4" I. D. Hollow Stem Augers

Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. 14-3

WELL LOCATION SCMF No. 14

SURFACE ELEVATION 919.1

DATE INSTALLED 2-23-87

TOP OF CSG. ELEVATION 921.99

TYPE OF WELL 1" Porous Stone with 3/4" Riser Pipe

DATE	WATER SURFACE DEPTH (FT.) *	WATER SURFACE ELEV. (FT.)	INSTALLATION	DESCRIPTION
				<div> <div>DESCRIPTION</div> <div>DEPTH (FT.)</div> </div>

JOB NUMBER 1221-87-136-1.2
OWNER CECOS International

SOIL & MATERIAL ENGINEERS, INC.

225 CORPORATE COURT
FAIRFIELD, OHIO 45042
874-4111

*REFERENCE Top of 3/4" Pipe

RECORD OF BORING NO. 14-4

Client: CECOS International
Project: SCMF No. 14
Project No.: 021-86-389

Page: 1 of 4

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
910.8	0.0	Mottled brown and gray sandy silty clay	1	0.0-2.0	SS	1-6-12-20	18
909.8	1.0	Brown sandy silty clay with gravel	2	2.0-4.0	SS	30-27-30-40	18
907.8	3.0	Gray sandy clayey silt with gravel (till)					
906.8	4.0	Mottled brown and gray sandy silty clay with gravel (till)	3	4.0-6.0	SS	9-3-5-4	24
906.1	4.7	Gray sandy clayey silt with gravel (till)	4	6.0-8.0	SS	1-2-3-4	20
903.8	7.0	Mottled brown and gray sandy silty clay with gravel (till)	5	8.0-10.0	SS	2-3-3-6	20
			6	10.0-12.0	SS	5-13-20-25	15
899.8	11.0	Brown and rust brown sandy clayey silt with gravel (till)	7	12.0-14.0	SS	16-23-43-53	24
897.8	13.0	Gray sandy clayey silt with gravel (till)	8	14.0-16.0	SS	21-25-24-27	24
			9	16.0-18.0	SS	12-18-18-22	24
			10	18.0-20.0	SS	17-22-23-18	13
			11	20.0-22.0	SS	35-57-60-47	20
889.8	21.0	Brown and gray sandy silt with gravel (till)					

Dates Drilled: 2-20,24-87
Water Depth: Initial:
Days after Completion:
Days after Completion:
Drilling Method: 3-1/4" Hollow Stem Augers

Driller: P. Martin
NOTE: 140-lb. hammer used for
samples 1&2; 380-lb. remaining
S&ME, INC.
Cincinnati, Ohio

RECORD OF BORING NO. 14-4

Client: CECOS International
 Project: SCMF No. 14
 Project No.: 021-86-389

Page: 2 of 4

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
888.7	22.1	Brown and gray sand with gravel, wet	12	22.0-24.0	SS	37-59-48-61	24
			13	24.0-26.0	SS	40-51-74-186	24
			14	26.0-28.0	SS	136-81-147- 321	20
883.3	27.5	Gray sandy clayey silt with gravel (till)	15	28.0-30.0	SS	25-33-53-79	21
881.6	29.2	Gray silt with fine sand					
881.2	29.6	Gray sandy clayey silt with gravel (till)	16	30.0-32.0	SS	35-56-114- 108	24
			17	32.0-34.0	SS	49-73-65-84	24
			18	34.0-36.0	SS	43-65-56-84	24
		- Seam of Dark gray-black fine sand @ 81.3'	19	36.0-38.0	SS	22-30-41-28	24
			20	38.0-40.0	SS	16-24-27-33	24
			21	40.0-42.0	SS	13-23-23-26	24
			22	42.0-44.0	SS	15-20-20-25	24
			23	44.0-46.0	SS	16-28-27-37	24
			24	46.0-48.0	SS	9-22-22-31	24
			25	48.0-50.0	SS	19-24-27-36	24
			26	50.0-52.0	SS	15-25-39-36	24

Dates Drilled: 2-20,24-87

Driller: P. Martin

Water Depth: Initial:

NOTE: 140-lb hammer used for

Days after Completion:

samples 1&2; 380-lb. remainin

Days after Completion:

S&ME, INC.

Drilling Method: 3-1/4" Hollow Stem Augers

Cincinnati, Ohio

RECORD OF BORING NO. 14-4

Client: CECOS International
 Project: SCMF No. 14
 Project No.: 021-86-389

Page: 3 of 4

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
			27	52.0-54.0	SS	16-25-22-28	24
			28	54.0-56.0	SS	9-16-19-28	24
			29	56.0-58.0	SS	9-19-19-34	24
			30	58.0-60.0	SS	10-20-31-34	24
			31	60.0-62.0	SS	10-13-20-30	24
			32	62.0-64.0	SS	11-13-19-27	24
			33	64.0-66.0	SS	10-13-16-25	24
			34	66.0-68.0	SS	10-12-17-20	24
			35	68.0-70.0	SS	7-11-15-18	24
			36	70.0-72.0	SS	10-11-15-23	24
			37	72.0-74.0	SS	9-10-14-21	22
			38	74.0-76.0	SS	8-11-18-21	22
			39	76.0-78.0	SS	9-10-21-27	24
			40	78.0-80.0	SS	10-12-20-17	24
			41	80.0-82.0	SS	8-13-19-22	24
			42	82.0-84.0	SS	10-20-14-16	24
828.3	82.5	Gray and dark brown sandy clayey silt with fine gravel and organic material (till)					
827.9	82.9	Gray and black fine - medium sand					
827.0	83.8	Gray sandy clayey silt with gravel (till)	43	84.0-86.0	SS	5-8-11-11	24
			44	86.0-88.0	SS	8-12-12-15	24
824.0	86.8	Brown and olive sandy silty clay with gravel, (till)	45	88.0-90.0	SS	5-7-11-11	24
			46	90.0-92.0	SS	4-6-10-11	24
			47	92.0-94.0	SS	12-12-12-12	24

Dates Drilled: 2-20,24-87

Driller: P. Martin

Water Depth: Initial:

Note: 140-lb. hammer used fo

Days after Completion:

samples 1&2; 380-lb

remaining

Days after Completion:

S&ME, INC.

Drilling Method: 3-1/4" Hollow Stem Augers

Cincinnati, Ohio

Client: CECOS International
 Project: SCMF No. 14
 Project No.: 021-86-389

Page: 4 of 4

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
817.6	93.2	Dark brown sandy clayey silt with organic material (till)					
817.5	93.3	Blue-gray sandy silty clay	48 49	94.0-96.0 96.0-98.0	SS SS	8-11-13-13 12-15-17-30	24 24
812.8	98.0	Gray weathered shale and limestone	50	98.0-98.6	SS	110-152/1	8
812.2	98.6	Interbedded gray shale and limestone		98.6-104.0	NX		64
806.8	104.0	Boring terminated @ 104.0'					

Dates Drilled: 2-20,24-87

Driller: P. Martin

Water Depth: Initial:

NOTE: 140-lb. hammer used for

Days after Completion:

Samples 1&2; 380-lb. remainin

Days after Completion:

S&ME, INC.

Drilling Method: 3-1/4" Hollow Stem Augers

Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. 14-4

WELL LOCATION SCME No. 14

SURFACE ELEVATION 910.8

DATE INSTALLED 2-24-87

TOP OF CSG. ELEVATION 913.25

TYPE OF WELL 1" Porous Stone with 3/4" Riser Pipe

DATE	WATER SURFACE DEPTH (FT.) *	WATER SURFACE ELEV. (FT.)	INSTALLATION	DESCRIPTION
			DESCRIPTION	DEPTH (FT.)
				2.5
				0.0
				Grout
				94.5
				Bentonite
				95.5
				Sand Pack
				97.5
			Porous stone	
				99.5
				103.0
				Bentonite
				104.0

JOB NUMBER 1221-87-136-1.2

OWNER CECOS International

SOIL & MATERIAL ENGINEERS, INC.

225 CORPORATE COURT
FAIRFIELD, OHIO 45042

874-4111

* REFERENCE Top of 3/4" Pipe

RECORD OF BORING NO. 14-5

Client: CECOS International
Project: SCMF #12 & 14 Design
Project No.: 021-86-386

Page:1 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
902.9	0.0	Augered without sampling					
899.9	3.0	Gray sandy silty clay	1	3.0-5.0	SS	2-3-3-3	7
897.9	5.0	Mottled brown and gray sandy silty clay	2	5.0-7.0	SS	2-3-2-3	24
			3	7.0-9.0	SS	2-2-3-6	24
894.4	8.5	Brown sandy clayey silt with gravel (till)	4	9.0-11.0	SS	9-18-24-25	24
			5	11.0-13.0	SS	16-19-35-34	24
			6	13.0-15.0	SS	7-14-22-16	16
			7	15.0-17.0	SS	5-5-10-13	24
			8	17.0-19.0	SS	7-8-7-8	24
			9	19.0-21.0	SS	4-6-6-10	24
			10	21.0-23.0	SS	4-5-8-9	24
			11	23.0-25.0	SS	4-9-20-22	18
			*	25.0-27.0	SS	No Sample	0
			12	27.0-29.0	SS	8-46-62-33	15
873.0	29.9	Gray silty sand with gravel, wet	13	29.0-31.0	SS	9-17-19-14	24
			14	31.0-33.0	SS	6-9-13-11	22
			15	33.0-35.0	SS	37-10-13-11	24
			16	35.0-37.0	SS	19-23-16-26	24
			17	37.0-39.0	SS	6-7-16-22	24

Dates Drilled: 2-4/5-87

Driller: F. Moore

Water Depth: Initial: None

Note: 300 lb. hammer used

Drilling Method: 3-1/4" I. D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

RECORD OF BORING NO. 14-5

Client: CECOS International
 Project: SCMF #12 and 14 Design
 Project No.: 021-86-386

Page:2 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
864.2	38.7	Brown sandy clayey silt with gravel (till)	18	39.0-41.0	SS	18-33-43-76	24
			19	41.0-43.0	SS	20-39-62-152	24
			20	43.0-45.0	SS	14-22-53-92	17
			21	45.0-47.0	SS	20-26-71-146	24
			22	47.0-49.0	SS	22-50-55-66	24
			23	49.0-51.0	SS	26-41-58-78	24
			24	51.0-53.0	SS	19-36-47-69	24
			25	53.0-55.0	SS	17-28-40-63	24
			26	55.0-57.0	SS	15-24-34-58	24
			27	57.0-59.0	SS	26-36-63-72	24
			28	59.0-61.0	SS	17-33-31-36	24
			29	61.0-63.0	SS	15-26-32-58	24
			30	63.0-65.0	SS	11-18-29-36	24
			31	65.0-67.0	SS	16-21-23-76	24
			32	67.0-69.0	SS	19-23-26-38	24
			33	69.0-71.0	SS	4-8-21-26	13
			34	71.0-73.0	SS	9-9-12-29	20
			35	73.0-75.0	SS	11-16-25-33	24
			36	75.0-77.0	SS	10-11-19-22	24
826.1	76.8	Blue - green weathered shale	37	77.0-79.0	SS	4-4-6-9	24
823.6	79.3	Blue - green weathered shale and limestone fragments	38	79.0-81.0	SS	17-39-33-42	24
			39	81.0-82.5	SS	52-60-75	18
820.4	82.5	Boring terminated @ 82.5'					

Dates Drilled: 2-4/5-87
 Water Depth: Initial: None

Driller: F. Moore
 Note: 300 lb. hammer used

Drilling Method: 3-1/4" I. D. Hollow Stem Augers

S&ME, INC.
 Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. 14-5

WELL LOCATION 14-5 SURFACE ELEVATION _____

DATE INSTALLED 1-21-87 TOP OF CSG. ELEVATION _____

TYPE OF WELL 1" Porous Stone with 3/4" Riser Pipe

DATE	WATER SURFACE DEPTH (FT.) *	WATER SURFACE ELEV. (FT.)	INSTALLATION	DESCRIPTION
			DESCRIPTION	DEPTH (FT.)

JOB NUMBER 021-86-396

OWNER CECOS International

*REFERENCE Top of 3/4" Pipe

SOIL & MATERIAL ENGINEERS, INC.

225 CORPORATE COURT
FAIRFIELD, OHIO 45042
874-4111

RECORD OF BORING NO.

14-7

Client: CECOS International
 Project: SCMF No. 14 Boring Program
 Project No.: 021-86-386

Page: 1 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
914.2	0.0	No sample taken					
909.2	5.0						
902.2	12.0	Mottled gray, light gray, and brown silty clay	1	5.0-10.0	CS*		60
			2	10.0-13.5	CS		42
901.3	12.9	Brown silty clay slightly mottled					
894.2	20.0	Gray and brown mottled sandy silty clay	3	13.5-15.0	CS		18
			4	15.0-20.0	CS		30
		Gray sandy clayey silty with gravel, minor brown iron stains 20.0-20.5'	5	20.0-25.0	CS		27.6
			6	25.0-27.0	SS	11-15-24-27	24
7	27.0-29.0		SS	9-16-20-32	24		
8	29.0-31.0		SS	9-14-19-23	24		
9	31.0-33.0		SS	9-12-29-30	20		
881.7	32.5	Gray silty gravelly sand	10	33.0-35.0	SS	50-71-126-49	24
	11		35.0-37.0	SS	23-18-13-15	24	
878.5	35.7	Gray sandy clayey silt with gravel	12	37.0-39.0	SS	8-13-15-17	24
			13	39.0-41.0	SS	10-11-12-14	24
			14	41.0-43.0	SS	5-10-19-22	24
			15	43.0-45.0	SS	13-16-22-23	24
			16	45.0-47.0	SS	12-16-22-23	24
			17	47.0-49.0	SS	9-18-23-35	24
			18	49.0-51.0	SS	12-14-16-22	24
			19	51.0-53.0	SS	15-17-22-24	24
			20	53.0-55.0	SS	10-16-23-26	24
			21	55.0-57.0	SS	15-22-25-36	24
			22	57.0-59.0	SS	12-13-25-36	22
			23	59.0-61.0	SS	16-18-27-36	24
			24	61.0-63.0	SS	38-49-32-38	16
			25	63.0-65.0	SS	11-17-19-33	24
			26	65.0-67.0	SS	9-16-21-30	24
			27	67.0-69.0	SS	12-12-13-20	24
			28	69.0-71.0	SS	16-18-25-24	23

Dates Drilled: 1/6-9/1987

Driller: F. Moore

Water Depth: Initial:

Note: 300 lb. hammer used

Days after Completion:

CS* = 5' continuous sampler

Days after Completion:

Drilling Method: 3 1/4" I.D. Hollow Stem Augers

SOIL & MATERIAL ENGINEERS, INC.
 Cincinnati, Ohio

RECORD OF BORING NO.

14-7

Client: CECOS International
 Project: SCMF No. 14 Boring Program
 Project No.: 021-86-386

Page: 2 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
841.3	72.9	Gray silty clayey sand with gravel, seams of sandy clayey silt and silt with plant material	29 30 31 32 33	71.0-73.0 73.0-75.0 75.0-77.0 77.0-79.0 79.0-81.0		16-18-11-25 16-11-16-24 16-11-28-55	24 24 24 17 20
833.2	81.0	Gray sandy clayey silt with gravel	34 35 36 37 38 39	81.0-83.0 83.0-85.0 85.0-87.0 87.0-89.0 89.0-91.0 91.0-93.0		15-17-15-18 10-11-33-35 12-12-17-28 14-14-13-23 12-13-11-13 10-10-14-15	21 20 24 24 18 24
820.7	93.5	Gray silt with seams of very fine sand	40	93.0-95.0		8-8-12-11	18
818.3	95.9	Gray sandy (very fine sand)	41	95.0-97.0		10-10-13-15	21
817.2	97.0	Gray sandy clayey silt with gravel, occasional disseminated blue material	42 43	97.0-99.0 99.0-101.0		8-8-9-10 3-4-6-11	22 21
812.9	101.3	Gray silty clay, disseminated blue material	44 45	101.0-103.0 103.0-105.0		5-8-10-12 6-8-12-67	24 24
809.5	104.7	Limestone and weathered shale					
		Boring terminated @ 105.0'					

Dates Drilled: 1/6-9/1987

Driller: F. Moore

Water Depth: Initial:

Note: 300 lb. Hammer used

Days after Completion:

Days after Completion:

Drilling Method: 3 1/4" I.D. Hollow Stem Augers

SOIL & MATERIAL ENGINEERS, INC.
 Cincinnati, Ohio

LOCATION MAP		PARSONS ENGINEERING SCIENCE LOG				PAGE 1 OF 2	
ELEVATION		BORING NUMBER 880PZ-1		LOCATION CECOS			
		DATE 9-16-97		WEATHER 82°. PARTLY CLOUDY			
		LOCATED BY ERIC MYSONA		DRILLED BY BOART LONGYEAR			
		DRILLING METHOD 8.25" HSA		SAMPLING METHOD 2" SPLIT SPOON			
		GRAVEL PACK #5 SILICA SAND		SEAL BENTONITE			
CASING TYPE SCH 40 PVC		DIAMETER 1"		LENGTH 29'		HOLE DIA. 13"-6"	
SCREEN TYPE SCH 40 PVC		SLOT 0.010"		DIAMETER 1"		LENGTH 5'	
						TOTAL DEPTH 34'	
SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH (FT)	SAMPLE RECOVERY	PENETRATION RESISTANCE	DESCRIPTION/REMARKS (COLOR, MOISTURE, PLASTICITY, SORTING, SOIL TYPE.)	LITHO PROFILE	WELL COMPLETION FLUSH MOUNT PROTECTIVE COVER
		0		300lb	HAMMER		
		1			SLIGHTLY MOIST GRAY & BROWN SILTY CLAY WITH 5% GRAVEL (FILL)		
		2					
		3					
		4					
		5					
		6					
		7					
		8					
		9					
		10					
		11			MOIST GRAY CLAYEY SAND (FILL) DRY, BRITTLE BROWN SILTY CLAY WITH 10% GRAVEL		
		12			MOIST, BROWN CLAYEY SAND MOIST BROWN MEDIUM SAND		
		13					
		14					
		15					
		16					
		17					
		18					
		19					
		20					
		21					
		22			DRY, BRITTLE, GRAY SILTY CLAY WITH 15% GRAVEL (TILL)		
		23			1/4" MOIST GRAVEL, SAND & SILT DRY, BRITTLE, GRAY SILTY CLAY WITH 20% GRAVEL (TILL)		
		24					
		25					
		26					
		27					
		28					
		29					
		30					
		31					
		32					
SET 8" STEEL CASING TO 22'							

FEBRUARY-9-98 BTMH 726691-880PZ-11.DWG

SAND
 CASING
 BENTONITE
 INITIAL WATER LEVEL

BACKFILL
 SCREEN
 CEMENT
 STATIC WATER LEVEL

CECOS 087232

LOCATION MAP		PARSONS ENGINEERING SCIENCE LOG				PAGE 2 OF 2					
		BORING NUMBER 880PZ-1		LOCATION CECOS							
		DATE 9-16-97		WEATHER 82°. PARTLY CLOUDY							
		LOCATED BY ERIC MYSONA		DRILLED BY BOART LONGYEAR							
		DRILLING METHOD 8.25" HSA		SAMPLING METHOD 2" SPLIT SPOON							
		GRAVEL PACK #5 SILICA SAND		SEAL BENTONITE							
ELEVATION		CASING TYPE SCH 40 PVC		DIAMETER 1"		LENGTH 29'		HOLE DIA. 13"-6"			
		SCREEN TYPE SCH 40 PVC		SLOT 0.010"		DIAMETER 1"		LENGTH 5'		TOTAL DEPTH 34'	
SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH (FT)	SAMPLE RECOVERY	PENETRATION RESISTANCE	(DESCRIPTION/REMARKS COLOR, MOISTURE, PLASTICITY, SORTING, SOIL TYPE.)	LITHO. PROFILE	WELL COMPLETION				
		20									
		21		7	DRY, BRITTLE, GRAY SILTY CLAY WITH 15% GRAVEL (TILL)						
		22		10							
				15							
		23		18							
				18							
		24		26							
				32							
		25		32	DRY, HARD, GRAY SILTY CLAY WITH SOME GRAVEL & COBBLE						
				42							
		26		52							
				17							
		27		50							
				67							
		28		90							
				16							
		29		24							
				35							
		30		54							
				20							
		31		32	WET GRAY SILTY SAND WITH SOME GRAVEL						
				50							
		32		55							
				21							
		33		115	MOIST, HARD GRAY SILTY CLAY WITH SOME GRAVEL						
				100/2							
		34			BORING ENDS AT 34'						
		35									
		36									
		37									
		38									
		39									
		40									
		41									

FEBRUARY-9-98\BTMH 726691-880PZ-12.DWG

SAND
 BACKFILL

CASING
 SCREEN

BENTONITE
 CEMENT

INITIAL WATER LEVEL
 STATIC WATER LEVEL

CECOS 087230

LOCATION MAP		PARSONS ENGINEERING SCIENCE LOG				PAGE 1 OF 2			
		BORING NUMBER 880PZ-2			LOCATION CECOS				
		DATE 9-16-97			WEATHER 82°. PARTLY CLOUDY				
		LOCATED BY ERIC MYSONA			DRILLED BY BOART LONGYEAR				
		DRILLING METHOD 8.25" HSA TO 19'			SAMPLING METHOD 2" SPLIT SPOON				
		GRAVEL PACK #5 SILICA SAND			SEAL BENTONITE				
ELEVATION 906.5									
CASING TYPE SCH 40 PVC				DIAMETER 1"		LENGTH 29'		HOLE DIA. 13"-6"	
SCREEN TYPE SCH 40 PVC				SLOT 0.010"		DIAMETER 1"		LENGTH 5'	TOTAL DEPTH 34'
SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH (FT)	SAMPLE RECOVERY	PENETRATION RESISTANCE	DESCRIPTION/REMARKS (COLOR, MOISTURE, PLASTICITY, SORTING, SOIL TYPE.)	LITHO. PROFILE	WELL COMPLETION		
		0		300lb	HAMMER 0 TO 21'				
		1			MOIST GRAVEL FILL				
		2			SLIGHTLY MOIST BROWN SILTY CLAY WITH 15% GRAVEL				
		3							
		4							
		5							
		6							
		7							
		8							
		9							
		10							
		11							
		12							
		13							
		14							
		15							
		16							
		17							
		18							
		19							
		20							
		21							

FEBRUARY-9-98/ETMH 726691-880PZ-21.DWG
 SAND
 BACKFILL

CASING
 SCREEN

BENTONITE
 CEMENT

INITIAL WATER LEVEL
 STATIC WATER LEVEL

CECOS 087234

LOCATION MAP				PARSONS ENGINEERING SCIENCE LOG		PAGE 1 OF 2	
BORING NUMBER 880PZ-3				LOCATION CECOS			
DATE 9-15-97				WEATHER 78° PARTLY CLOUDY			
LOCATED BY ERIC MYSONA				DRILLED BY BOART LONGYEAR			
DRILLING METHOD 8.25" HSA TO 19'				SAMPLING METHOD 2" SPLIT SPOON			
ELEVATION 915.5				GRAVEL PACK #5 SILICA SAND		SEAL BENTONITE	
CASING TYPE SCH 40 PVC				DIAMETER 1"		LENGTH 27'	
SCREEN TYPE SCH 40 PVC				SLOT 0.010"		DIAMETER 1"	
				LENGTH 5'		HOLE DIA. 13"-6"	
						TOTAL DEPTH 32'	
SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH (FT)	SAMPLE RECOVERY	PENETRATION RESISTANCE	DESCRIPTION/REMARKS (COLOR, MOISTURE, PLASTICITY, SORTING, SOIL TYPE)	LITHO. PROFILE	WELL COMPLETION
		0		300lb	HAMMER		
		1					
		2			SLIGHTLY MOIST, PLASTIC BROWN & GRAY SILTY CLAY WITH 5% GRAVEL		
		3					
		4					
		5		3			
		6		2			
		7		3			
		8		4			
		9		3			
		10		6			
		11		8			
		12		7			
		13		3			
		14		3			
		15		2			
		16		3			
		17		4			
		18		3			
		19		3			
		20		20			
		21		50/1"			
		22					
		23		16			
		24		10	2" OF MOIST BROWN CLAYEY SAND		
		25		6	DRY, BRITTLE BROWN & GRAY SILTY CLAY WITH 15% GRAVEL		
		26		8			
		27		10			
		28		13			
		29		16			
		30		10			
		31		12	DRY, BRITTLE GRAY SILTY CLAY WITH 15% GRAVEL (TILL)		
		32		18			
		33		16			
		34		20			

SET 8" STEEL CASING TO 23'

FEBRUARY-8-98/STW 720691-880PZ-J1.DWG

SAND CASING BENTONITE INITIAL WATER LEVEL
 BACKFILL SCREEN CEMENT STATIC WATER LEVEL

LOCATION MAP					PARSONS ENGINEERING SCIENCE LOG		PAGE 2 OF 2	
BORING NUMBER 880PZ-3					LOCATION CECOS			
DATE 9-15-97					WEATHER 78°. PARTLY CLOUDY			
LOCATED BY ERIC MYSONA					DRILLED BY ROBERT LONGYEAR			
DRILLING METHOD 8.25" HSA					SAMPLING METHOD 2" SPLIT SPOON			
GRAVEL PACK #5 SILICA SAND					SEAL BENTONITE			
ELEVATION								
CASING TYPE SCH 40 PVC					DIAMETER 1"		LENGTH 27'	
SCREEN TYPE SCH 40 PVC					SLOT 0.010"		DIAMETER 1"	
					LENGTH 5'		HOLE DIA. 13"-6"	
							TOTAL DEPTH 32'	
SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH (FT)	SAMPLE RECOVERY	PENETRATION RESISTANCE	DESCRIPTION/REMARKS (COLOR, MOISTURE, PLASTICITY, SORTING, SOIL TYPE)	LITHO. PROFILE	WELL COMPLETION	
		20						
		21		7				
		22		15	SLIGHTLY MOIST, NON-PLASTIC GRAY SILTY CLAY WITH 15% GRAVEL (TILL)			
		23		18				
		24		32	DRY, BRITTLE GRAY SILTY CLAY WITH 15% GRAVEL (TILL)			
		25		32				
		26		42				
		27		52				
		28		17				
		29		50	WET GRAY SILTY SAND			
		30		67				
		31		90				
		32		20	MOIST GRAY SILTY CLAY WITH SOME GRAVEL			
		33		32				
		34		50				
		35		55				
		36			BORING ENDS AT 32'			
		37						
		38						
		39						
		40						
		41						

FEBRUARY-9-98 (STN) 72681-880PZ-32.DWG

SAND

BACKFILL

CASING

SCREEN

BENTONITE

CEMENT

INITIAL WATER LEVEL

STATIC WATER LEVEL

LOCATION MAP		PARSONS ENGINEERING SCIENCE LOG				PAGE 1 OF 2	
		BORING NUMBER 880PZ-4			LOCATION CECOS		
		DATE 9-15-97			WEATHER 69°. PARTLY CLOUDY		
		LOCATED BY ERIC MYSONA			DRILLED BY BOART LONGYEAR		
		DRILLING METHOD 8.25" HSA TO 16', 3.25" HSA			SAMPLING METHOD 2" SPLIT SPOON		
		GRAVEL PACK #5 SILICA SAND			SEAL BENTONITE		
ELEVATION 906.5							
CASING TYPE SCH 40 PVC				DIAMETER 1"		LENGTH 19.5'	
SCREEN TYPE SCH 40 PVC				SLOT 0.010"		DIAMETER 1" LENGTH 5'	
						HOLE DIA. 13"-6"	
						TOTAL DEPTH 24.5'	
SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH (FT)	SAMPLE RECOVERY	PENETRATION RESISTANCE	DESCRIPTION/REMARKS (COLOR, MOISTURE, PLASTICITY, SORTING, SOIL TYPE)	LITHO. PROFILE	WELL COMPLETION
		0		300lb	HAMMER 0-17'		
		1					
		2					
		3					
		4					
		5		4	SLIGHTLY MOIST, PLASTIC, BROWN & GRAY SILTY CLAY WITH 5% GRAVEL		
		6		3			
		7		2			
		8		3			
		9		5			
		10		3			
		11		3			
		12		4	DRY, FRIABLE, BROWN & GRAY SILTY CLAY WITH 15% GRAVEL, MOIST ZONE AT 12'		
		13		8			
		14		12			
		15		21			
		16		22			
		17		16			
		18		38	MOIST BROWN & GRAY GRAVEL WITH SAND & SILT		
		19		41			
		20		43			
		21		19	DRY, FRIABLE GRAY SILTY CLAY WITH 15% GRAVEL		
		22		17			
		23		23			
		24		27			
		25		50			
		26		60	MOIST BROWN SILT & SAND		
		27		3			
		28		14			
		29		38	DRY GRAY SILTY CLAY WITH SOME GRAVEL		
		30		42			
		31					
		32					

FEBRUARY-9-98 BTMH 726691-880PZ-41.DWG

SAND

BACKFILL

CASING

SCREEN

BENTONITE

CEMENT

INITIAL WATER LEVEL

STATIC WATER LEVEL

CECOS 087238

LOCATION MAP			PARSONS ENGINEERING SCIENCE LOG			PAGE 2 OF 2		
ELEVATION			BORING NUMBER 880PZ-4		LOCATION CECOS			
			DATE 9-17-97		WEATHER 69°. PARTLY CLOUDY			
			LOCATED BY ERIC MYSONA		DRILLED BY BOART LONGYEAR			
			DRILLING METHOD 3.25" HSA 16'-24.5			SAMPLING METHOD 2" SPLIT SPOON		
			GRAVEL PACK #5 SILICA SAND			SEAL BENTONITE		
CASING TYPE SCH 40 PVC			DIAMETER 1"		LENGTH 19.5'		HOLE DIA. 13"-6"	
SCREEN TYPE SCH 40 PVC			SLOT 0.010"		DIAMETER 1"		LENGTH 5'	
TOTAL DEPTH 24.5'								
SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH (FT)	SAMPLE RECOVERY	PENETRATION RESISTANCE	DESCRIPTION/REMARKS (COLOR, MOISTURE, PLASTICITY, SORTING, SOIL TYPE.)	LITHO. PROFILE	WELL COMPLETION	
		20		140lb	HAMMER FROM 16-24'			
		21		25	MOIST, BROWN SILTY CLAY WITH SOME GRAVEL			
				35				
				90				
		22		100/4	DRY, NON-PLASTIC GRAY SILTY CLAY WITH SOME GRAVEL			
				32				
				92				
		23		15				
		24						
		25			BORING EMDS AT 24.5'			
		26						
		27						
		28						
		29						
		30						
		31						
		32						
		33						
		34						
		35						
		36						
		37						
		38						
		39						
		40						
		41						

FEBRUARY-9-98 BTMH 726891-880PZ-42.DWG

SAND
 BACKFILL

CASING
 SCREEN

BENTONITE
 CEMENT

INITIAL WATER LEVEL
 STATIC WATER LEVEL

CECOS

087239

LOCATION MAP			PARSONS ENGINEERING SCIENCE LOG			PAGE 1 OF 2	
BORING NUMBER 880PZ-5			LOCATION CECOS				
DATE 9-15-97			WEATHER 78°, PARTLY CLOUDY				
LOCATED BY ERIC MYSONA			DRILLED BY BOART LONGYEAR				
DRILLING METHOD 8.25" HSA			SAMPLING METHOD 2" SPLIT SPOON				
ELEVATION 914.3'			GRAVEL PACK #5 SILICA SAND			SEAL BENTONITE	
CASING TYPE SCH 40 PVC			DIAMETER 1"		LENGTH 32'	HOLE DIA. 1.3"-6"	
SCREEN TYPE SCH 40 PVC			SLOT 0.010"	DIAMETER 1"	LENGTH 5'	TOTAL DEPTH 40'	
SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH (FT)	SAMPLE RECOVERY	PENETRATION RESISTANCE	DESCRIPTION/REMARKS (COLOR, MOISTURE, PLASTICITY, SORTING, SOIL TYPE)	LITHO. PROFILE	WELL COMPLETION
		0		300lb	HAMMER 0-24'		
		1					
		2			SLIGHTLY MOIST, PLASTIC, BROWN & GRAY SILTY CLAY WITH 5% GRAVEL		
		3					
		4					
		5		4			
		6		3			
		7		2			
		8		2			
		9		3			
		10		4			
		11		4			
		12		1	SLIGHTLY MOIST, PLASTIC, BROWN & GRAY SILTY CLAY WITH 10% GRAVEL		
		13		2			
		14		4			
		15		1	DRY, BRITTLE, BROWN SILTY CLAY WITH 10% GRAVEL		
		16		2			
		17		8			
		18		7			
		19		6			
		20		12	DRY GRAY SILTY CLAY WITH 15% GRAVEL (TILL)		
		21		18	1" MOIST CLAYEY SAND SEAM		
		22		19			
		23		10			
		24		12			
		25		25			
		26		30			
		27		15	DRY, BRITTLE, GRAY SILTY CLAY WITH 15% GRAVEL (TILL)		
		28		17			
		29		15			
		30		21			

SET 8" STEEL CASING TO 22'

FEBRUARY-9-98 BTM 726291-880PZ-51.DWG

SAND

BACKFILL

CASING

SCREEN

BENTONITE

CEMENT

INITIAL WATER LEVEL

STATIC WATER LEVEL

LOCATION MAP		PARSONS ENGINEERING SCIENCE LOG				PAGE 2 OF 2	
		BORING NUMBER 880PZ-5			LOCATION CECOS		
		DATE 9-15-97			WEATHER 78°, PARTLY CLOUDY		
		LOCATED BY ERIC MYSONA			DRILLED BY BOART LONGYEAR		
		DRILLING METHOD 3.25" HSA 24-40'			SAMPLING METHOD 2" SPLIT SPOON		
		GRAVEL PACK #5 SILICA SAND			SEAL BENTONITE		
ELEVATION 914.3'							
CASING TYPE SCH 40 PVC DIAMETER 1" LENGTH 32' HOLE DIA. 13"-6" SCREEN TYPE SCH 40 PVC SLOT 0.010" DIAMETER 1" LENGTH 5' TOTAL DEPTH 40'							
SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH (FT)	SAMPLE RECOVERY	PENETRATION RESISTANCE	DESCRIPTION/REMARKS (COLOR, MOISTURE, PLASTICITY, SORTING, SOIL TYPE)	LITHO. PROFILE	WELL COMPLETION
		20		140lb	HAMMER 24 - 40'		
		21		8	DRY, FRIABLE, GRAY SILTY CLAY WITH 15% GRAVEL (TILL)		
		22		6			
		23		9			
		24		5			
		25		5			
		26		10	1" MOIST SAND & GRAVEL SEAM		
		27		13			
		28		9			
		29		75	SLIGHTLY MOIST GRAY SILTY CLAY WITH SOME GRAVEL		
		30		100/3"			
		31		7			
		32		21			
		33		76			
		34		50/2			
		35		20	MOIST GRAY SILTY CLAY WITH SOME GRAVEL, WITH THIN, WET GRAVEL SEAMS		
		36		100			
		37		100/5			
		38		52			
		39		100			
		40		100/4			
		41		72	DRY, GRAY SILTY CLAY WITH SOME GRAVEL		
		42		100/5			
		43		40			
		44		60			
		45		84			
		46		100			
		47		40	BORING ENDS AT 40'		
		48		55			
		49		82			
		50		100			

FEBRUARY-8-98 BTWH 728681-880PZ-SZ.DWG
 SAND CASING BENTONITE INITIAL WATER LEVEL
 BACKFILL SCREEN CEMENT STATIC WATER LEVEL

SET 8" STEEL CASING TO 22'

WELL RECORD

Field Number M-25
May 1986

WELL OWNER Santow CEL

WELL NO. 2 M-25 M

Date: 12-20-79

alt. measurement for top of casing

WELL CASING DETAILS

Length _____

Diameter 4" PVC

Kind PVC sch. 40 galv.

STRAINER DETAILS

Make WW

Length 4' 4"

Diameter 4" ID

Slot sizes 20#

Metal SS

STRAINER FITTINGS

Top Mab 4" thread

Bottom Mab 4" thread

PUMP TEST

Static level 25

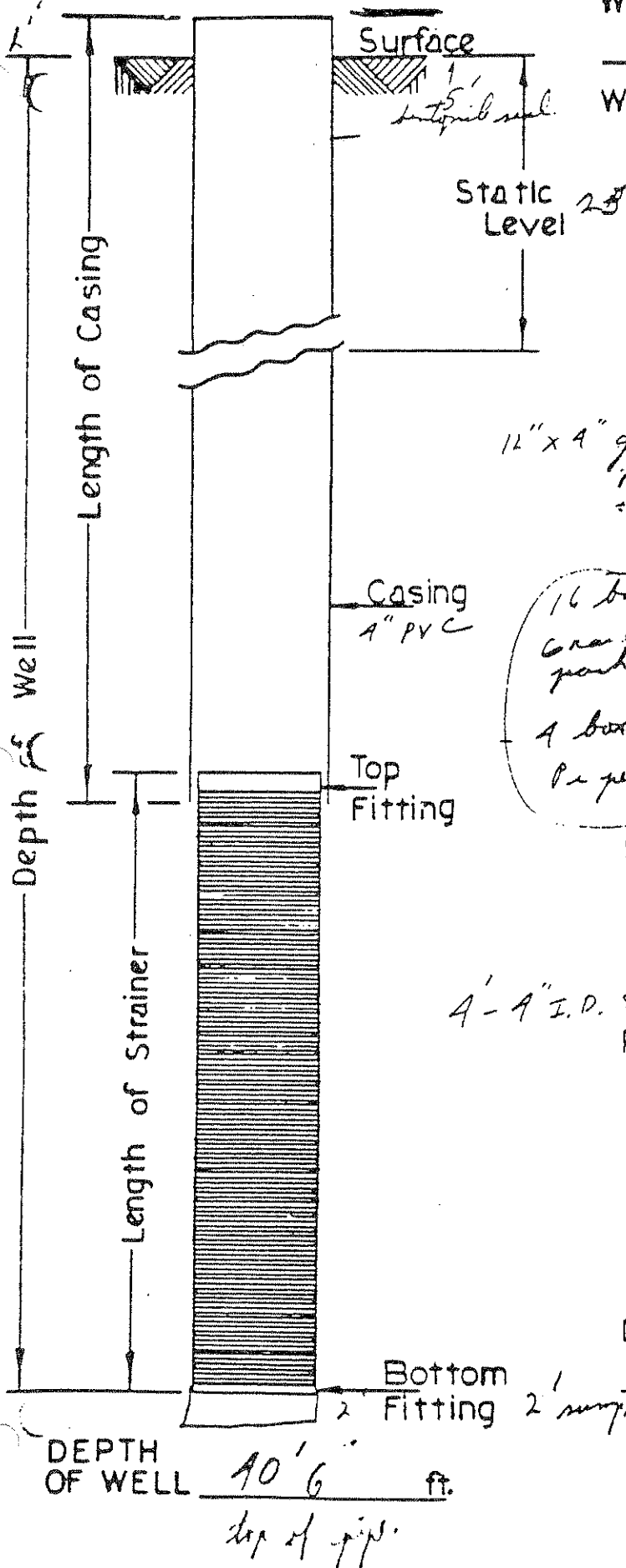
Rate 3

Draw down 35' pumping level

Hours pumped 4

DRILLER E. W. Hoober

MOODY'S of Dayton, Inc.
P. O. Box 123
Miamisburg, Ohio 45342



May 1986

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

TEST BORING RECORD

Driller William J. Sacconi

Hole No 200

Surface
Elevation

Sheet 1 of 1

Water Level

For Browning-Ferris Industries, Inc.

1 hr.	24 hrs.
100	100
90	90
80	80
70	70
60	60
50	50
40	40
30	30
20	20
10	10
0	0

CECOS Aber Road Facility

Casing Hammer Wt. 140 lbs. Drop 30 in.

Location Williamsburg, Ohio

Sampler Hammer Wt. 140 lbs. Drop 30

Started 11/26/85

Completed 12/2/85

Job No. 85147-

Sampler Size 2 in O.D. Casing Size 8

10

ELEVATION	DEPTH 0.0	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows & Penetration on Sampler
			28.0' Augered - No Sampling				
	28.0		7.0' Brownish Gray to Dark Gray Sandy Silt with Rock Fragments, Very Dense, Dry			29.0	52-63-50/ C
	35.0		4.0' Coarse Dark Gray Sand, Loose, Wet			33.8	40-50/.3
	39.0		1.0' Dk Gray Clayey Silt, Dense, Dry			36.5	2-10-16
	40.0						

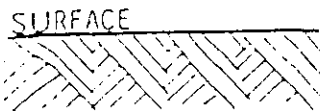
MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 200

DATE COMPLETED 12/2/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE

HEIGHT OF RISER PIPE
ABOVE GROUND SURFACE 2.0'



GROUT FROM 30.0' TO
TOP OF HOLE

30.0'

DEPTH OF TOP OF
BENTONITE

32.0'

DEPTH OF TOP OF
SAND PACK

AMOUNT OF 4"
STAINLESS STEEL
RISER PIPE 36.0'

DEPTH TO TOP
OF 4" STAINLESS
STEEL SCREEN 34.0'

DEPTH TO BOTTOM
OF 4" STAINLESS
STEEL SCREEN 39.0'

TOTAL DEPTH OF BOREHOLE 40.0'

Field Number MP201
May 1986



THE H. C. NUTTING COMPANY

GEOTECHNICAL AND TESTING ENGINEERS

SINCE 1911

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TEST BORING REPORT

3/21/84 JLS
Page 1 of 2

CLIENT E. A. Engineering ORDER No. 10033.006
PROJECT Proposed Groundwater Monitoring Well Replacements, HOLE No. M-65 MP201
Northwest Site Area, CER Landfill, Clermont County, Ohio
LOCATION As shown on plan
DRILLER Willard Martin DRILL No. 36 DATE STARTED 3/6/84
ELEVATION REFERENCE 907.8 DATE COMPLETED 3/6/84
CASING: DIAMETER 6" I.D. Hollow Stem Auger HAMMER WT. FALL
SAMPLER: DIAMETER & TYPE 2" O. D. Split Spoon HAMMER WT. 140# FALL 30"
DEPTH TO WATER: IMMEDIATE 35', Trace at 10.5' UPON COMPLETION
DEPTH TO WATER DAYS AFTER COMPLETION WATER USED IN DRILLING From 35.0'

ELEVATION	DEPTH 0'	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or 15" Core Rec.	Remarks
	1.5'	Brown sandy silty clay with rock fragments (fill), moist - very stiff	1	0-1.5	SS	10-18-14	13"
	1.5'		2	1.5-3	SS	9-10-11	18"
	3.0'	Brown and gray sandy silty clay, moist - stiff	3	3-4.5	SS	4-6-8	18"
	4.5'		4	4.5-6	SS	7-9-11	18"
	1.5'	Brown and gray sandy silty clay with rock fragments and sand lenses, moist - very stiff					
	6.0'		5	6-7.5	SS	6-9-11	18"
	1.5'	Brown and gray silty clay, moist - stiff					
	7.5'		6	7.5-9	SS	7-11-16	18"
	3.0'	Brown and dark gray sandy silty clay, moist - stiff to very stiff	7	9-10.5	SS	7-11-14	18"
	10.5'						

Respectfully submitted,

THE H. C. NUTTING CO.

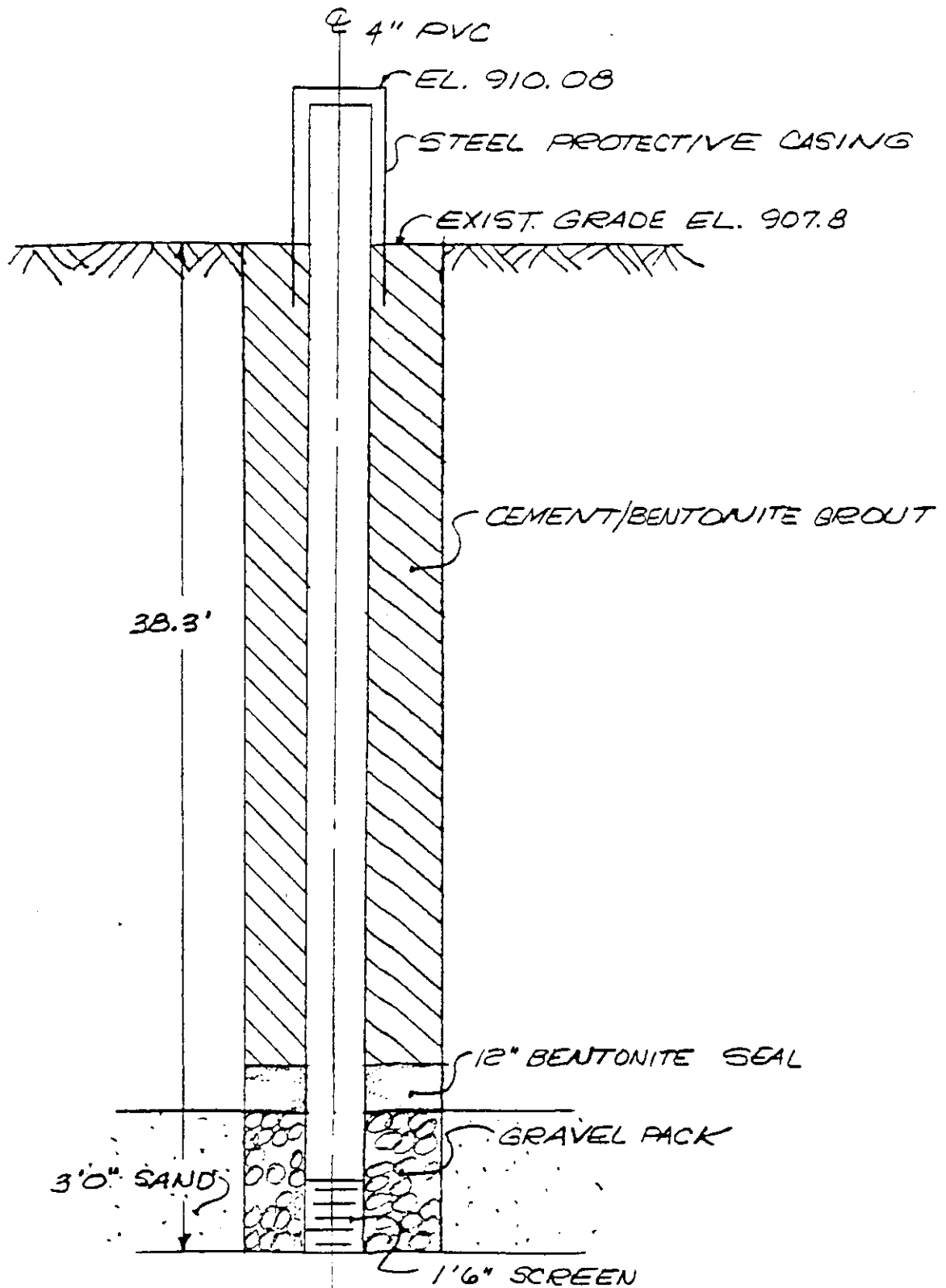
By

M. E. Nutting

Samples received from test boring are for inspection only and are not to be used for any other purpose. The company assumes no responsibility for interpretation of data or for any other use of the data. The company is not responsible for any damage to property or for any other loss or expense incurred by the client or third parties in connection with the boring.

PROJECT Proposed Groundwater Monitoring Well Replacements. HOLE No. M-201
Northwest Site Area, CER Landfill, Clermont County, Ohio

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER	Recovery
	10.5'						
	1.5'	Dark gray and brown sandy silty clay with sand seams, moist - very stiff	8	10.5-12	SS	12-42-68	18"
12.0'	3.0'	Brown, gray and reddish brown sandy silty clay with rock fragments and gravel, moist - hard	9 10	12-13.5 13.5-15	SS SS	21-42-64 17-48-68	18"
15.0'	1.5'	Gray and reddish brown sandy silty clay with rock fragments and gravel, moist - hard	11	15-16.5	SS	21-45-55	18"
16.5'	1.5'	Gray sandy silty clay with 3" sand layer, gravel and rock fragments, moist - hard	12	16.5-18	SS	15-31-58	18"
18.0'	16.5'	Gray sandy silty clay with gravel and rock fragments, moist - hard	13 14 15 16 17 18 19 20 21 22 23	18-19.5 19.5-21 21-22.5 22.5-24 24-25.5 25.5-27 27-28.5 28.5-30 30-31.5 31.5-33 33-34.5	SS SS SS SS SS SS SS SS SS SS SS	13-22-31 18-25-44 21-41-54 22-47-71 18-46-83 21-59-111 25-64-75 24-44-58 23-43-54 17-30-42 14-26-34	18" 18" 18" 18" 18" 18" 18" 18" 18" 18" 18"
34.5'	0.5'	Gray sandy silty clay with sandy silt seams, gravel and rock fragments, moist - hard	24	34.5-35	SS	- 13 -	6"
35.0'	3.0'	Gray fine to coarse sand, trace of fine gravel, wet - dense	25 26 27	35-36 36-37.5 37.5-38	SS SS SS	21-27 7-11-20 - 9 -	8" 12" 6"
38.0'	0.3'	Gray sandy silty clay with rock fragments and gravel, moist - hard	28	38-38.3	SS	2/40	8"
38.3'		BORING COMPLETED					
		Set well at 38', 1.5' screen -", 2 bags cement. 1 bag cement					



M-65
MP201

FIGURE 2.53

PIEZOMETER CONSTRUCTION
DETAIL - REPLACEMENT
FOR M-25

Field Number MP202

May 1986



THE H. C. NUTTING COMPANY

GEOTECHNICAL AND TESTING ENGINEERS

SINCE 1921

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TEST BORING REPORT

3/6/84 js

CLIENT EA Engineering ORDER No. 10233.006

PROJECT Proposed Groundwater Monitoring Well Replacements, HOLE No. B-146 -/ **MP 202**
Northwest Site Area, CER Landfill, Clermont County, Ohio **M-63**

LOCATION As directed by client

DRILLER W. Martin DRILL No. 36 DATE STARTED 2/26/84

ELEVATION REFERENCE 909.8 DATE COMPLETED 3/2/84

CASING: DIAMETER 6" I.D. Hollow Stem Auger HAMMER WT. FALL

SAMPLER: DIAMETER & TYPE 2" O.D. Split Spoon HAMMER WT. 150# FALL 30"

DEPTH TO WATER: IMMEDIATE 28.0' UPON COMPLETION

DEPTH TO WATER DAYS AFTER COMPLETION Set Well WATER USED IN DRILLING From 30.0'

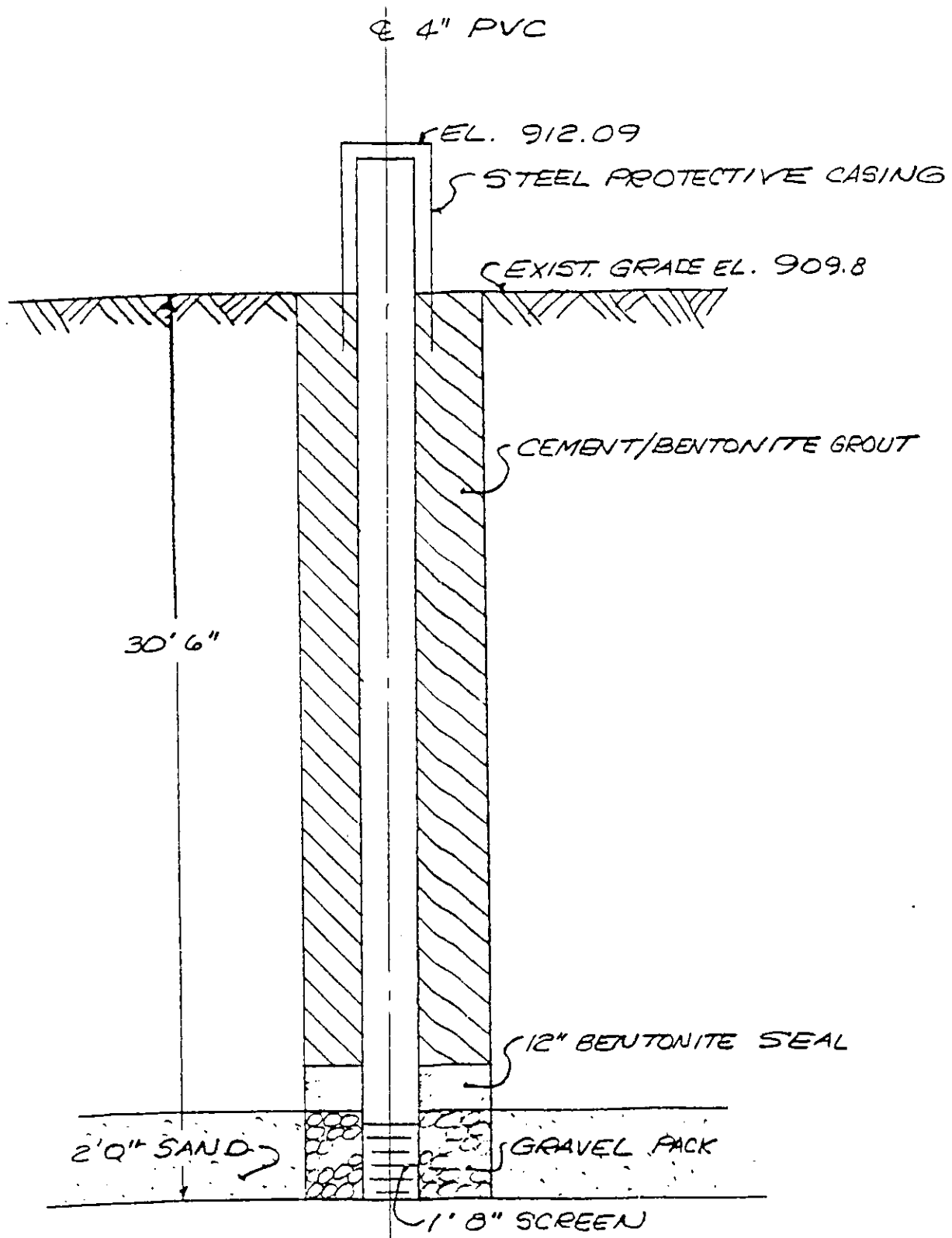
ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
	0'						
	25.0'	Overburden (No Samples)					
	25.0'		1	25-26	SS	25-157	7"
			2	26-27	SS	36-63	12"
		Gray sandy silty clay with rock fragments and gravel, moist - hard	3	27-28	SS	33-89	12"
	28.0'		4	28-29	SS	18-30	10"
			5	29-30	SS	10-14	10"
		Gray fine to coarse sand with fine gravel, wet - dense to medium dense					
	30.0'		6	30-30.5	SS	- 30 -	5"
		Gray sandy silty clay with rock fragments and gravel, moist - hard					
	30.5'						
		BORING COMPLETED					
		Set well at 30.0'					
		6" protective casing					
		1.5" screen (4")					
		6 bags cement					
		1/2 bag bentonite					

Respectfully submitted,

THE H. C. NUTTING CO.

By

Samples recovered from this test boring are available for inspection, which is strongly recommended. The company assumes no responsibility for interpretations made by others or load bearing stability excavating or other physical characteristics of materials penetrated in the boring.



M-63
(IN BORING B-146-1)
MP202

FIGURE 2.52

PIEZOMETER CONSTRUCTION
DETAIL - REPLACEMENT FOR M-19

MP 203 A



THE H. C. NUTTING COMPANY

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TEST BORING REPORT

2/16/84 js

Page 1 of 2

CLIENT E-A Engineering ORDER No. 10233.005

PROJECT CECOS International, Secured Cell No. 8, HOLE No. 57-A
Piezometer Installation, Clermont County, Ohio

LOCATION As shown on plan

DRILLER C. Moore DRILL No. 31 DATE STARTED 2/9/84

ELEVATION REFERENCE _____ DATE COMPLETED 2/10/84

CASING: DIAMETER 3.25" I.D. Hollow Stem Auger HAMMER WT. _____ FALL _____

SAMPLER: DIAMETER & TYPE 2" O. D. Split Spoon HAMMER WT. 140# FALL 30"

DEPTH TO WATER: IMMEDIATE None UPON COMPLETION _____ None _____

DEPTH TO WATER _____ DAYS AFTER COMPLETION _____ WATER USED IN DRILLING _____ No _____

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
	0'						
	15.0'	Gray and brown sandy clay with gravel and rock fragments (fill), moist - stiff to hard (driller's description)					
	15.0'						
	10.0'	Brown silty clay with fine gravel, moist - stiff (driller's description)					
	25.0'						
	5.0'	Gray sandy silty clay with gravel and rock fragments, moist - hard	1	28.5-30	SS	35-48-62	18"
	30.0'		2	30-31.5	SS	24-26-30	18"
	2.5'	Gray sandy silty clay with fine sand lenses, gravel and rock fragments, moist - hard	3	31.5-32.5	SS	28-57	11"
	32.5'		4	32.5-33	SS	- 82 -	6"
	2.0'	Brown fine sand with gray sandy silty clay seams, moist - very dense	5	33-34.5	SS	55-98-200	18"
	34.5'						

Respectfully submitted,

THE H. C. NUTTING CO.

PROJECT CECOS International, Secured Cell No. 8, HOLE NO. 57-A
Piezometer Installation, Clermont County, Ohio

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
	34.5'						
		1.0' Brown fine sand and gravel, moist - very dense	6	34.5-35.5	SS	107-177	12"
	35.5'						
		0.5' Gray sandy silty clay with gravel and rock fragments, moist - hard	7	35.5-36	SS	- 225 -	6"
	36.0'						
		BORING COMPLETED					
		Note: Set 34'2" pipe in hole 2' well screen 2.5' stickup					



THE H. C. NUTTING COMPANY

GEOTECHNICAL AND TESTING ENGINEERS

SINCE 1921

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3-1-84 vf

TEST BORING REPORT

CLIENT EA Engineering ORDER No. 10233.005
PROJECT CECOS International, Secured Cell 18, HOLE No. M-57-C **MP203C**
Piezometer Installation, Clermont County, Ohio
LOCATION As directed by client
DRILLER B. Sharpe DRILL No. 31 DATE STARTED 2-14-84

ELEVATION REFERENCE _____ DATE COMPLETED 2-15-84
CASING: DIAMETER 3.25" I. D. Hollow Stem Auger HAMMER WT. _____ FALL _____
SAMPLER: DIAMETER & TYPE 2" O. D. Split Spoon HAMMER WT. 140# FALL 30"
DEPTH TO WATER: IMMEDIATE None UPON COMPLETION None
DEPTH TO WATER _____ DAYS AFTER COMPLETION set piezometer WATER USED IN DRILLING No

ELEVATION	DEPTH 0'	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
	30.0'	Augered boring - no sampling					
	30.0'	3.5' Gray sandy silty clay, trace of fine gravel and rock fragments, slightly moist - hard	1	30-31.5	SS	19-31-52	18"
	33.5'	1.0' Brown and gray fine sand with silty sand layers, trace of coarse sand and gravel, moist - very dense	2	33.5-34.5	SS	50-117	17"
	34.5'	1.5' Brown and gray sandy silty lean clay with gravel and rock fragments, slightly moist - hard	3 4	34.5-35 35-36	SS SS	-123- 50-400/5"	6" 8"
	36.0'	1.5' Gray sandy silty clay with gravel and rock fragments, slightly moist - hard	5	36-37.5	SS	32-65-124	18"
	37.5'						

BORING COMPLETED
Set 18" well screen
1/4 bag Bentonite
4 bags cement
38' pipe

15603633

Samples recovered from this test boring are available for inspection, which is strongly recommended. The company assumes no responsibility for interpretations made by others of load bearing, stability, excavating or other physical characteristics of materials penetrated in the boring.

Respectfully submitted,

THE H. C. NUTTING CO.

By

Mark F. Nutting

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

TEST BORING RECORD

Driller Dave Newman

Hole No. 203
For

Surface Elevation Sheet 1 of 1

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Water Level 1 hr. 24 hrs.

Casing Hammer Wt. lbs. Drop 30 in. Location

Sampler Hammer Wt. 140 lbs. Drop 30 in. Started 12/20/85

Sampler Size 2 in O.D. Casing Size 8 in. Completed 12/21/85 Job No. 85147-1

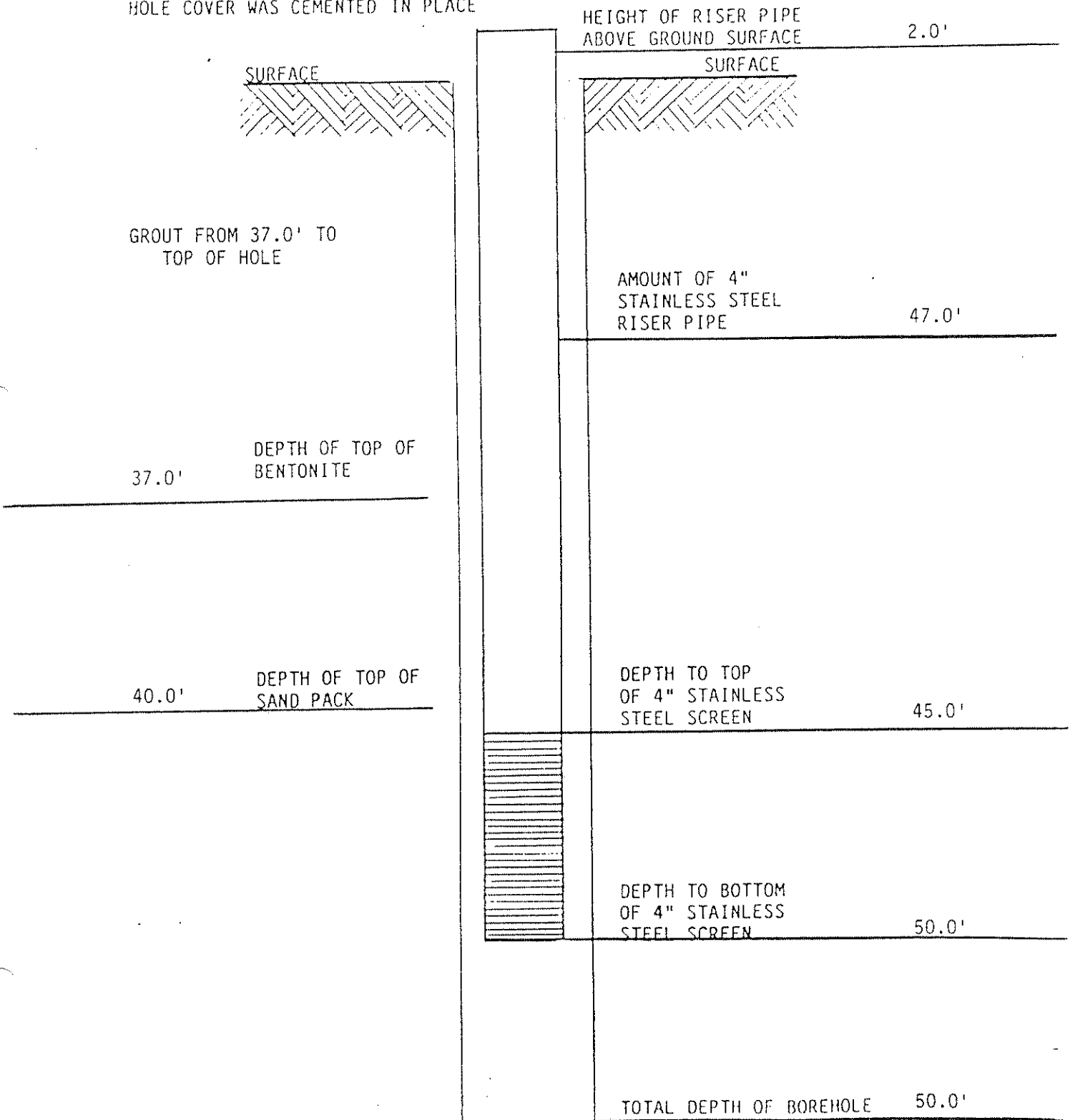
ELEVATION	DEPTH	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/6' Penetration on Sampler
	0.0						
	3.0		3.0' Gravel & Clay				
	14.0		11.0' Brown Clay, Moist				
	30.0		24.0' Brown Till, Some Sand & Silt				
	42.0		4.0' Brown Sand				
	50.0		8.0' Brown Till				

MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 203

DATE COMPLETED 12/21/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE





THE H. C. NUTTING COMPANY

GEOTECHNICAL AND TESTING ENGINEERS

SINCE 1921

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3-1-84 vf

Page 1 of 2

TEST BORING REPORT

CLIENT EA Engineering ORDER No. 10233.005

PROJECT CECOS International, Secured Cell No. 8, HOLE No. M58-A *200-A*

Piezometer Installation, Clermont County, Ohio

LOCATION As directed by client

DRILLER B. Sharpe DRILL No. 31 DATE STARTED 2-15-84

ELEVATION REFERENCE _____ DATE COMPLETED 2-16-84

CASING: DIAMETER 3.25" I. D. Hollow Stem Auger HAMMER WT. _____ FALL _____

SAMPLER: DIAMETER & TYPE 2" O. D. Split Spoon HAMMER WT. 140# FALL 30"

DEPTH TO WATER: IMMEDIATE None UPON COMPLETION None

DEPTH TO WATER _____ DAYS AFTER COMPLETION _____ WATER USED IN DRILLING No

ELEVATION	DEPTH 0'	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
	25.0'	Augered boring - no samples					
	25.0'		1	25-26.5	SS	19-28-54	18"
	3.0'	Gray sandy silty clay with gravel and rock fragments and sand lenses, slightly moist - hard	2	26.5-28	SS	19-49-34	18"
	28.0'		3	28-29.5	SS	63-63-108	18"
	3.0'	Gray and brown sandy silty clay with fine gravel, rock fragments, sand layers (less than 3"), sandy silt seams and wet seam at 28.5', slightly moist - hard	4	29.5-31	SS	33-58-67	18"
	31.0'		5	31-31.5	SS	32	6"
	0.5'	Brownish gray silty clay with silt lenses and wet seam, slightly moist - hard					
	31.5'		6	31.5-32.5	SS	135-260	12"
	2.4'	Gray silty fine sand with sandy silt, very moist - very dense	7	32.5-33.9	SS	32-64-119	17"
	33.9'					15603634	

Respectfully submitted,

THE H. C. NUTTING CO.

By *M. F. Feltner*

Samples recovered from this test boring are available for inspection, which is strongly recommended. The company assumes no responsibility for interpretations made by others of load bearing, stability, excavating or other physical characteristics of materials penetrated in the boring.

JECT CECOS International, Secured Cell No. 8, HOLE No. M58-A
Piezometer Installation, Clermont County, Ohio

LEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
	33.9'						
	0.1'	Gray clayey silt, moist - very stiff	8	33.9-34	SS		17"
	34.0'						
		BORING COMPLETED					
		Installed 30" well screen 36' pipe 1/4 bag Bentonite 4 bags cement					

15603635

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

TEST BORING RECORD

Driller James McCann

Hole No. 205-B

Surface Elevation

Sheet 1 of 1

Water Level

For

Browning-Ferris Industries, Inc.

1 hr. 24 hrs.

CECOS Aber Road Facility

Casing Hammer Wt. lbs. Drop 30 in.

Location

Williamsburg, Ohio

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Started 11/18/85

Completed 11/18/85 Job No. 85147-1

Sampler Size 2 in O.D. Casing Size 8 in.

DEPTH	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/6" Penetration on Sampler
0.0						
15.0		15.0' Stiff Brown Silty Clay, Damp				
21.5		6.5' Stiff Gray Silty Clay with Limestone, Damp				
24.0		2.5' Gray Sandy Silt, Wet				
33.0		9.0' Very Stiff Gray Silty Clay with Limestone, Damp			30.5	32-53-78
37.0		4.0' Gray Sand & Gravel, Wet			36.5	17-39-63
40.0		3.0' Very Stiff Gray Silty Clay with Shale, Damp			40.0	50-125

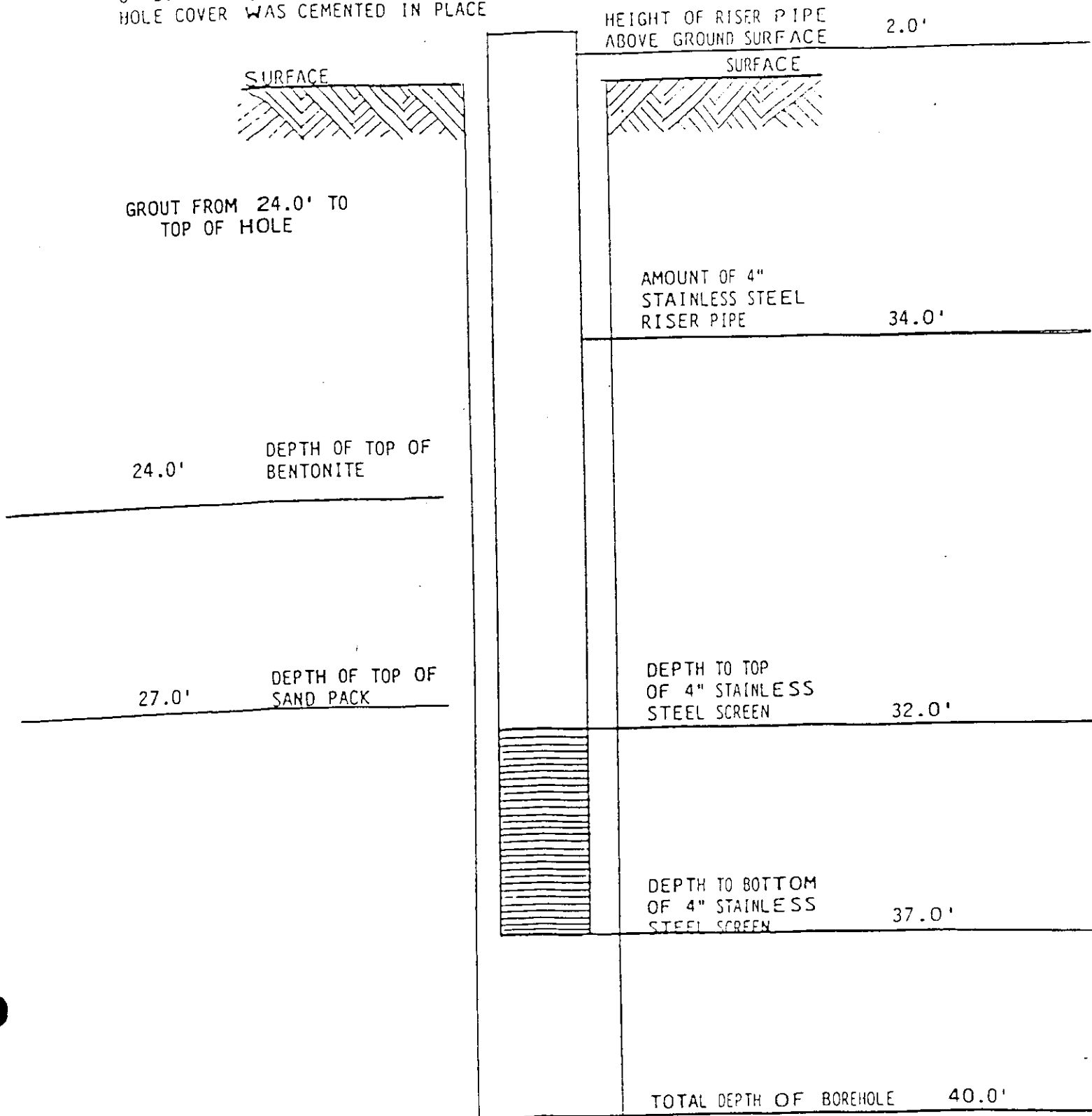
Field Number MP-205BR
May 1986

MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 205-B

DATE COMPLETED 11/18/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE



PROJECT CECOS International, Secured Cell No. 8, HOLE No. 59-C
Piezometer Installation, Clermont County, Ohio

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
	16.0'						
	4.0'	(Augered to 20.0', No samples obtained)					
	20.0'		5	20-21.5	SS	25-35-50	18"
	1.5'	Gray sandy silty clay with gravel, slightly moist - hard					
	21.5'		6	21.5-23	SS	60-40-150	18"
	1.5'	Grayish-brown silty fine to medium sand with sandy silty clay seams and gravel, moist - very dense					
	23.0'		7	23-23.5	SS	- 70 -	6"
	0.5'	Gray sandy silty clay with gravel, slightly moist - hard					
	23.5'						
		BORING COMPLETED					
		Well screen 18"					
		Pipe 23.5'					
		Sand pack 2'					
		Grout 21.5'					
		Stand pipe					

Field Number MP205D
May 1986



THE H.C. NUTTING COMPANY

GEOTECHNICAL AND TESTING ENGINEERS

SINCE 1921

4120 AIRPORT ROAD • PO BOX 6 • CINCINNATI, OHIO 45226 • 513-321-5216
812 MOFFS STREET • CHARLESTON, WEST VIRGINIA 25301 • 304-544-0601
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2/23/84 js

TEST BORING REPORT

CLIENT E.A. Engineering ORDER No. 10233.005
PROJECT CECOS International, Secured Cell #8, HOLE No. 59-D MP 205D
LOCATION Piezometer Installation, Clermont County, Ohio
As shown on plan
DRILLER C. Moore DRILL No. 31 DATE STARTED 2/12/84
DATE COMPLETED 2/12/84
ELEVATION REFERENCE 5.25" I.D. Hollow Stem Auger HAMMER WT. FALL
CASING: DIAMETER 2" O. D. Split Spoon HAMMER WT. 140# FALL 30"
SAMPLER: DIAMETER & TYPE None UPON COMPLETION None
DEPTH TO WATER IMMEDIATE None WATER USED IN DRILLING No
DEPTH TO WATER DAYS AFTER COMPLETION

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER (1st 1/2 Core Rec)	Recovery
9.12	0'						
	10.0'	Brown and gray silty clay with gravel, moist - stiff (driller's description)	1	10-11.5	SS	15-23-37	15"
	10.0'		2	11.5-13	SS	26-40-65	16"
	3.0'	Brown and gray sandy silty clay with gravel and rock fragments, slightly moist to moist - hard					
	13.0'		3	13-14.5	SS	33-75-63	18"
	1.5'	Brown and gray sandy silty clay with sand seams, gravel and rock fragments, moist - hard					
	14.5'		4	14.5-15	SS	- 23 -	5"
	0.5'	Brown silty fine to medium sand, moist - dense					
	15.0'		5	15-16	SS	45-65	12"
	1.0'	Gray and brown sandy silty clay with gravel and rock fragments, slightly moist - hard					
	16.0'						

Set 17.5' 2" PVC Pipe

BORING COMPLETED

Respectfully submitted,

THE H. C. NUTTING CO.

By

M. E. Nutting

Samples recovered from this test boring are available for inspection, which is strongly recommended. The company assumes no responsibility for interpretations made by others of load bearing, stability, excavating or other physical conditions of materials penetrated in the boring.

Field Number MP206

May 1986



THE H. C. NUTTING COMPANY

GEOTECHNICAL AND TESTING ENGINEERS

SINCE 1911

4120 A. REPORT ROAD • PO BOX 6 • CINCINNATI, OHIO 45226 • 513-251-5815
 912 MORRIS STREET • CHARLESTON, WEST VIRGINIA 25301 • 304-344-0271
 BOX NUMBER 11 • HIGHLAND HEIGHTS, KENTUCKY 41076 • 502-251-2043

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2/21/84 JS

TEST BORING REPORT

CLIENT E.A. Engineer Inc ORDER No. 10233, 005
 PROJECT CECOS International, Secured Call #8, HOLE No. North D M-6C
Piezometer Installation, Clermont County, Ohio MF-20V
 LOCATION As shown on plan
 DRILLER W. Martin DRILL No. 36 DATE STARTED 2/11/84
 DATE COMPLETED 2/12/84
 ELEVATION REFERENCE _____
 CASING DIAMETER 3.5" I.D. Hollow Stem Auger HAMMER WT. _____ FALL _____
 SAMPLER DIAMETER & TYPE 2" O.D. Split Spoon HAMMER WT. 140# FALL 30"
 DEPTH TO WATER IMMEDIATE _____ UPON COMPLETION _____
 DEPTH TO WATER _____ DAYS AFTER COMPLETION _____ WATER USED IN DRILLING _____

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE NO	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER FOOT ON SAMPLER (15' to 20' to 22')	REMARKS
	0'						
	34.0'	Overburden (No samples)					
	34.0'		1	34-35.5	SS	49-81-150	18"
			2	35.5-37	SS	40-81-130	18"
			3	37-38.5	SS	37-35-105	17"
	37.3'						
	1.2'	Gray silty fine sand, wet - very dense					
	38.5'		4	38.5-39	SS	- 30 -	6"
	0.5'	Gray sandy silty clay with clayey silt seams and sand lenses, trace of fine gravel and rock fragments, moist - hard					
	39.0'						
		Note: Set well at 38.5' 4 bags cement 1/2 bag bentonite 9" screen					

BORING COMPLETED

Respectfully submitted,

THE H. C. NUTTING CO.

Samples received from this test boring are available for inspection, which is
 strongly recommended. The company assumes no responsibility for interpretation
 of test results for foundation stability, excavation or other purposes.

May 1986

TEST BORING RECORD

Driller James McCann

Driller James McCann

Water Level

1 hr.

24 hrs.

Casing Hammer Wt.

the Drop

יב.

Location

Sampler Hammer Wt. 140

105. Dron

30

if

Started 11/20/85

Completed

11/20/85 Job No. 85147-1

Sampler Size

2 in O.D. Casing Size

5

55

SAMPLER SIZE		2 in O.D. CASING SIZE		5		in.	
DEPTH	0.0	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/6" Penetration on Sampler
			12.5' Brown Silty Clay				
	12.5		7.5' Very Stiff Gray Silty Clay with Limestone, Damp				
	20.0		6.3' Gray Sand & Gravel, Wet			21.0	45-75
	26.3		2.7' Very stiff Gray Silty Clay			26.3	23-29-70
	29.0						

May 1986

PITTSBURGH, PA. 15220

Water Level

1 hr. 24 hrs.

Casing Hammer Wt.	lbs.	Drop
-------------------	------	------

Sampler Hammer Wt. 140 lbs. Drop 30

Sampler Size 2 in O.D. Casing Size 8 in.

Hole No. 206-C

For

Surface
Elevation

Sheet 1 of 1

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Location

Started

11/19/85

Completed 11/20/85

Job No. 85147-1

SAMPLER SIZE		2 in O.D. CASING SIZE		8 in.		ELEVATION		DEPTH		Casing Hammer Blows		Driller's Log <input checked="" type="checkbox"/>		Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>		Remarks		Sample Depth		Blows/6" Penetration on Sampler	
								0.0													
								14.0				14.0' Stiff Brown Silty Clay, Moist									
								20.0				6.0' Stiff Gray Silty Clay with Limestone, Damp									
								24.0				4.0' Gray Sand & Gravel, Wet									
								29.0				5.0' Gray Silty Clay with Small Gravel, Moist - Till						30.0		15-22-37	
								36.0				7.0' Gray Sand & Gravel, Wet						35.0		17-36-62	
								40.0				4.0' Very Stiff Gray Silty Clay						40.0		57-105	

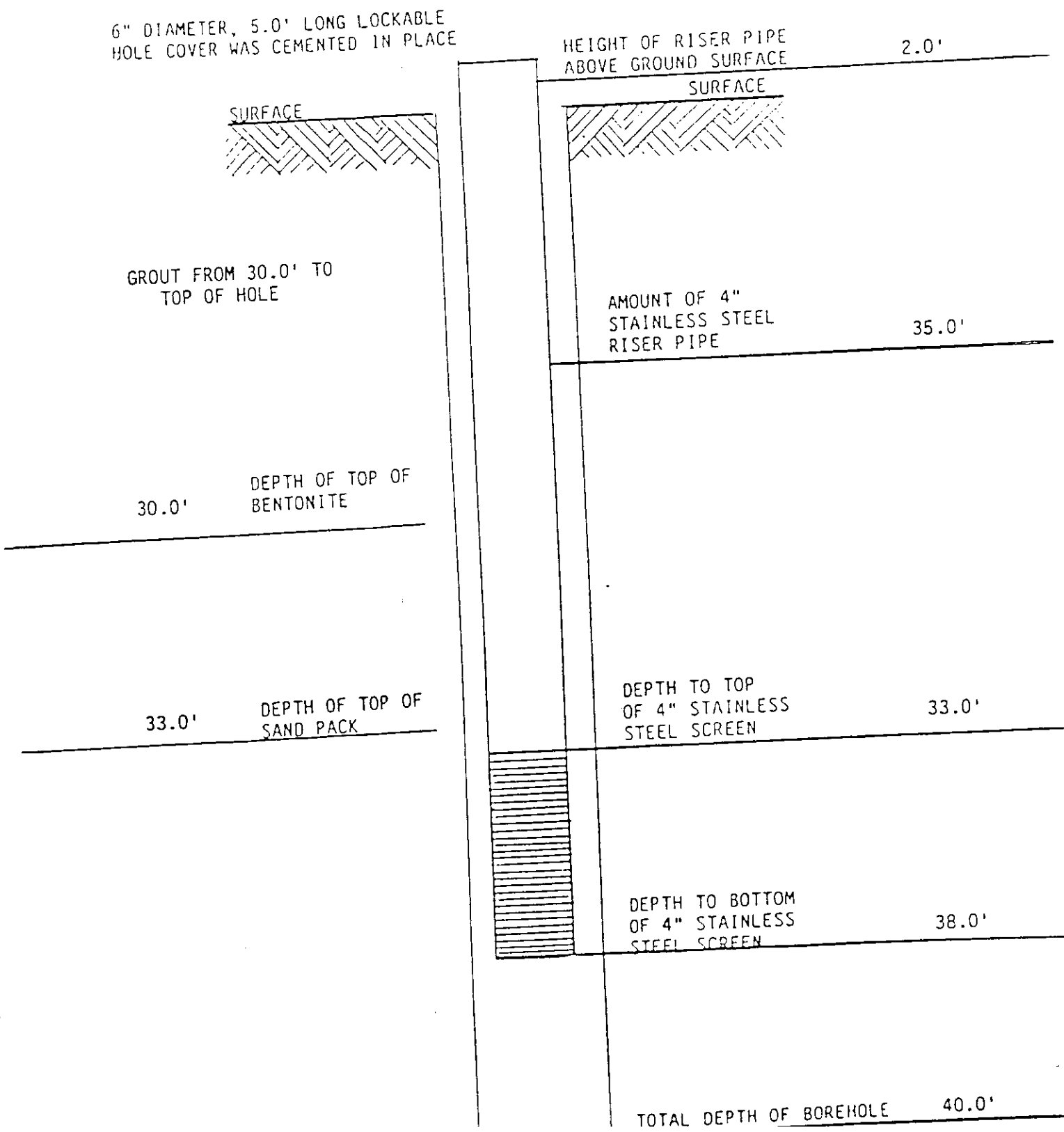
Field Number MP-206CR
May 1986

MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 206-C

DATE COMPLETED 11/20/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE



Field Number MP207
May 1986



THE H. C. NUTTING COMPANY

GEOTECHNICAL AND TESTING ENGINEERS

SINCE 1911

4120 AIRPORT ROAD • P.O. BOX C • CINCINNATI, OHIO 45226 • 513-321-5816
912 MORRIS STREET • CHARLESTON, WEST VIRGINIA 25301 • 304-344-0821
BOX NUMBER 11 • HIGHLAND HEIGHTS, KENTUCKY 41076 • 606-261-2043

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3/21/84 js

TEST BORING REPORT

CLIENT E. A. Engineering ORDER No. 10233.006
PROJECT Proposed Groundwater Monitoring Well Replacements, HOLE No. B-154 - M-66 MP207
Northwest Site Area, CER Landfill, Clermont County, Ohio
LOCATION As shown on plan
DRILLER Willard Martin DRILL No. 36 DATE STARTED 3/16/84
ELEVATION REFERENCE 904.1 DATE COMPLETED 3/17/84
CASING: DIAMETER 6" I.D. Hollow Stem Auger HAMMER WT. FALL
SAMPLER: DIAMETER & TYPE 2" O. D. Split Spoon HAMMER WT. 140# FALL 30"
DEPTH TO WATER: IMMEDIATE None UPON COMPLETION None
DEPTH TO WATER DAYS AFTER COMPLETION Set Well WATER USED IN DRILLING No

ELEVATION	DEPTH 0'	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Remarks
	0.5'	Brown and gray topsoil, wet	1	0-0.5	SS	- 1 -	6"
	0.5'		2	0.5-1.5	SS	2-2	12"
	1.0'	Brown and gray sandy clayey silt, trace of roots, very moist - medium stiff					
	1.5'		3	1.5-3	SS	2-3-6	18"
	4.5'	Mottled brown and gray sandy silty clay, moist to very moist - very stiff to stiff	4	3-4.5	SS	4-7-10	6"
			5	4.5-6	SS	6-9-11	3"
	6.0'		6	6-7.5	SS	6-11-18	18"
	7.5'	Brown, gray to reddish brown sandy silty clay with gravel and rock fragments, moist to slightly moist - very stiff to hard	7	7.5-9	SS	27-8-25	18"
			8	9-10.5	SS	23-35-52	18"
			9	10.5-12	SS	25-57-83	18"
			10	12-13.5	SS	32-77-118	18"
	13.5'		11	13.5-15	SS	19-57-99	18"
	31.5'	Gray sandy silty clay with gravel, rock fragments and sand seam (16.5'-18'), moist to slightly moist - hard	12	15-16.5	SS	30-52-103	18"
			13	16.5-18	SS	28-39-62	18"
			14	18-19.5	SS	33-51-44	18"
			15	19.5-21	SS	23-38-54	18"
			16	21-22.5	SS	20-27-38	18"

43.0'

BORING COMPLETED

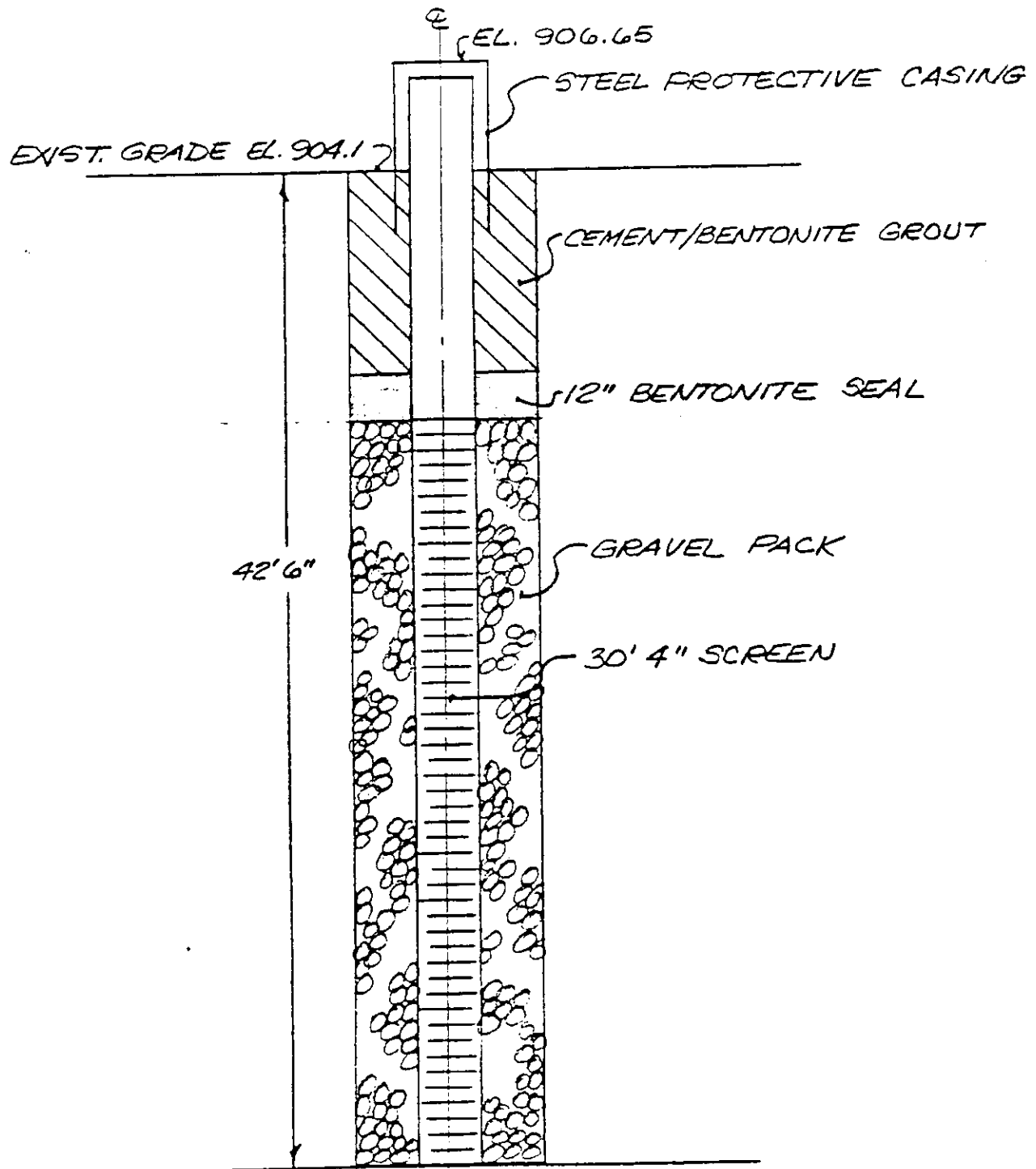
Set well 42.5', 30' 1" screen, 3 bags cement,
1 bag bentonite

Samples tested at 10' intervals. Bore logs are available for inspection. When it
strongly recommended. The company does not assume any responsibility for interpretation
of data or for any other physical data.

Respectfully submitted,

THE H. C. NUTTING CO.

M. F. V. L. T. R. U. O.



M-66
(IN BOEING 154)

MP 207

FIGURE 2.54

PIEZOMETER CONST-
RUCTION DETAIL
REPLACEMENT
FOR M-25

Field Number MP208
May 1986



THE H. C. NUTTING COMPANY

GEOTECHNICAL AND TESTING ENGINEERS

SINCE 192

4120 AIRPORT ROAD • P.O. BOX C • CINCINNATI, OHIO 45226 • 513-321-5811
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TEST BORING REPORT

3/6/84 js

CLIENT EA Engineering ORDER No. 10233.006
PROJECT Proposed Groundwater Monitoring Well Replacements, HOLE No. B-147-1 MP208
Northwest Site Area, CER Landfill, Clermont County, Ohio M-32
LOCATION As directed by client
DRILLER W. Martin DRILL No. 36 DATE STARTED 2/24/84
ELEVATION REFERENCE 905.3 DATE COMPLETED 2/25/84
CASING: DIAMETER 6" I.D. Hollow Stem Auger HAMMER WT. FALL
SAMPLER: DIAMETER & TYPE 2" O. D. Split Spoon HAMMER WT. 140# FALL 30"
DEPTH TO WATER: IMMEDIATE 24.5' UPON COMPLETION
DEPTH TO WATER DAYS AFTER COMPLETION Set well WATER USED IN DRILLING From

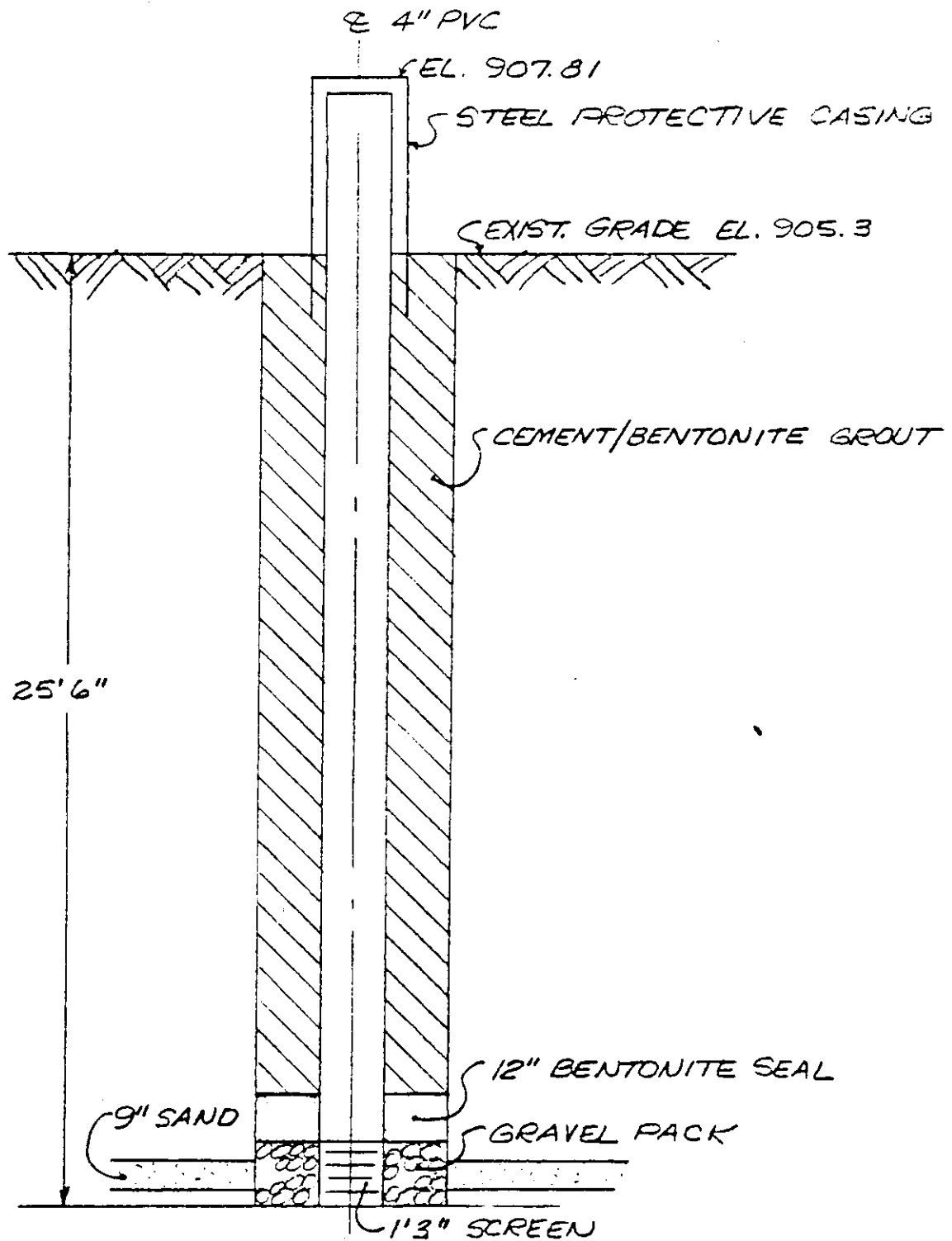
ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
	0'						
	17.0'	Overburden (No Samples)					
	17.0'		1	17-18.5	SS	19-41-67	16"
	7.5'	Gray sandy silty clay with rock fragments and gravel, moist - hard	2	18.5-20	SS	14-19-27	18"
			3	20-21.5	SS	15-19-32	16"
			4	21.5-22.5	SS	13-23	12"
	22.5'		5	22.5-23.5	SS	28-45	12"
	2.0'	Gray sandy silty clay with gravel, rock fragments and sand lenses, moist - hard to very stiff	6	23.5-24.5	SS	15-17	12"
	24.5'		7	24.5-25.5	SS	16-28	12"
	1.0'	Gray sandy clay with wet silty sand layers, moist - hard					
	25.5'						
		BORING COMPLETED Set well at 25.5' 1' screen (4") 7 bags cement 1 bag bentonite					

Respectfully submitted,

THE H. C. NUTTING CO.

By M. F. Nutting

Samples received from this test boring are available for inspection, which is strongly recommended. The company assumes no responsibility for interpretations made by others of load bearing, stability, excavating or other physical characteristics of materials penetrated in the boring.



M-62
(IN BORING B-147-1)

MP208

FIGURE 2.51

PIEZOMETER CONSTRUCTION DETAIL
REPLACEMENT FOR M-28

6/21/91

PITTSBURGH, PA. 15220

Driller James McCann

Water Level

1 hr.
24 hrs.

Casing Hammer Wt.	lbs.	Drop
-------------------	------	------

Sampler Hammer Wt. 140 lbs. Drop 30

Sampler Size 2 in O.D. Casing Size 8

Hole No. 209
for

Elevation

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Location

Started 11/20/85

Completed 11/22/85

Job No. 85147-1

MP 2072 LETTER from J. L. ...
USEPA Region II
May 1986
TEST BORING RECORD

TEST BORING RECORD

Surface ~ 920 @ time of boring
Elevation Sheet

Slack

of 3

SAMPLER SIZE		2 in O.D. CASING SIZE		8 in.			
LEVATION	DEPTH	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/6" Penetration on Sampler
	0.0						
	10.0		10.0' Brown Silty Clay, Moist				
	25.0		15.0' Stiff Gray Silty Clay with Limestone, Damp				
	30.0		5.0' Gray Sand & Gravel, Wet				
	50.0		67.0' Very Stiff Gray Silty Clay with Limestone, Damp				
			(Continued)				
						46.5	42-53-71

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

TEST BORING RECORD

Driller James McCann

Hole No. 209
For

Surface Elevation
Browning-Ferris Industries, Inc.
CECOS Aber Road Facility
Williamsburg, Ohio

Sheet 2 of 3

1 hr. 24 hrs.
Casing Hammer Wt. lbs. Drop in.
Sampler Hammer Wt. 140 lbs. Drop 30 in.
Sampler Size 2 in O.D. Casing Size 8 in.

Location
Started

Completed

Job No. 85147-1

LEVATION	DEPTH	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/6" Penetration on Sampler
	50.0		(Contd)			51.5	25-53-50/
			Very Stiff Gray Silty Clay with Limestone, Damp			56.5	20-39-79
						61.5	29-55-81
						66.1	52-79-100/ .1'
						71.3	29-53-100/ .3'
						76.0	81-110
						81.2	61-72-100
						86.1	65-91-135/ .1'
						91.4	33-47-100/ .4'
	97.0		8.0' Fine Gray Silty Sand with Clay, Moist			96.1	43-62-70/ .1'
	100.0		(Continued)				

May 1986

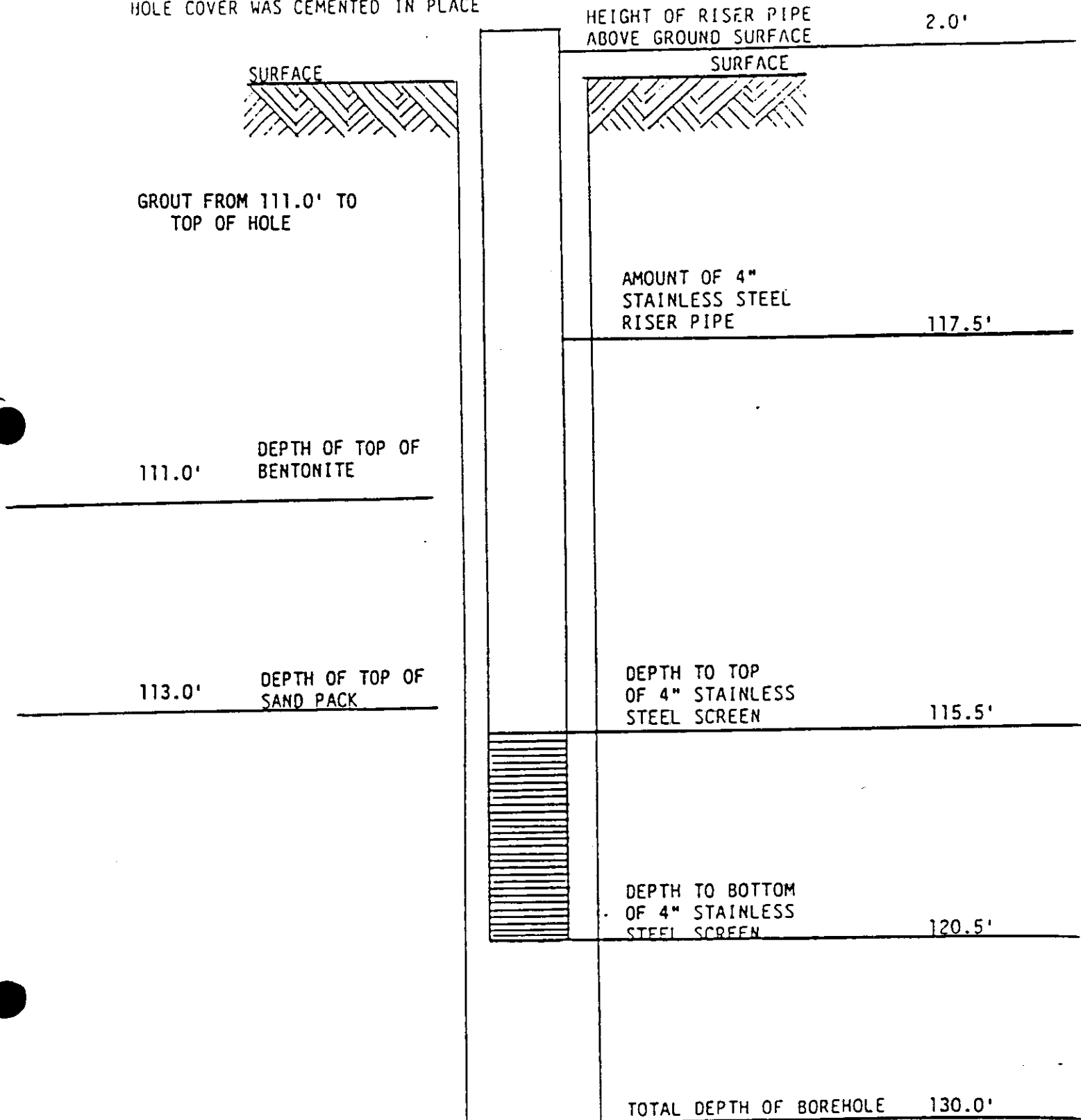
Letter from JWA to
USEPA Region IV

MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 209

DATE COMPLETED 11/22/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE

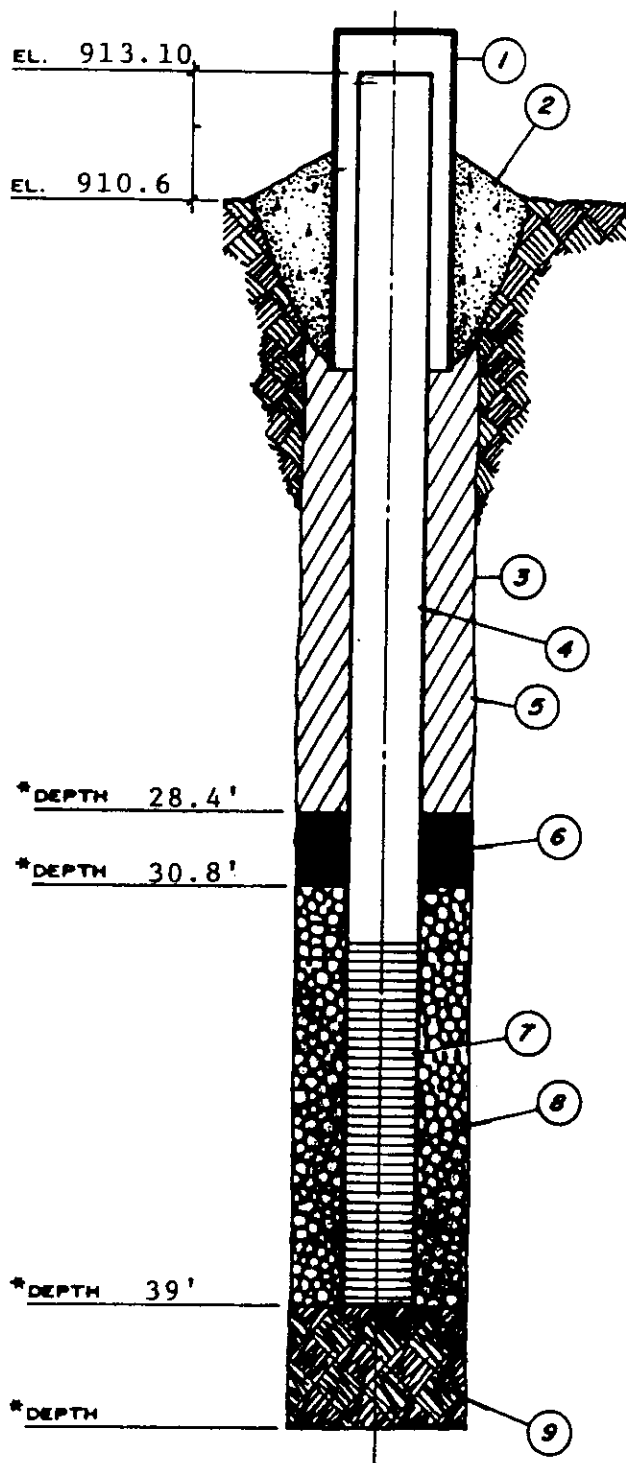


MONITOR WELL COMPLETION REPORT :

WELL № MP210AR JOB № 321-081

PROJECT CECOS International-Aber Road

installed 12/11/86



*all depths measured from ground surface.

1. PROTECTIVE CASING I.D. 8 INCHES.

2. SURFACE SEAL TYPE 5% bentonite grout

3. BOREHOLE DIAMETER 10 INCHES.

4. RISER PIPE:

a. Type 304 stainless-steel

b. I.D. 4 INCHES

c. Length 34.5 FEET

d. Joint Type flush thread coupled

5. BACKFILL:

a. Type 5% bentonite grout

b. Installation side discharge tremie

6. Type of SEAL 3/8-in. bentonite pellets

7. SCREEN

a. Type 304 stainless-steel

b. I.D. 4 INCHES

c. Slot Size 0.010 INCHES

d. Length 5 FEET

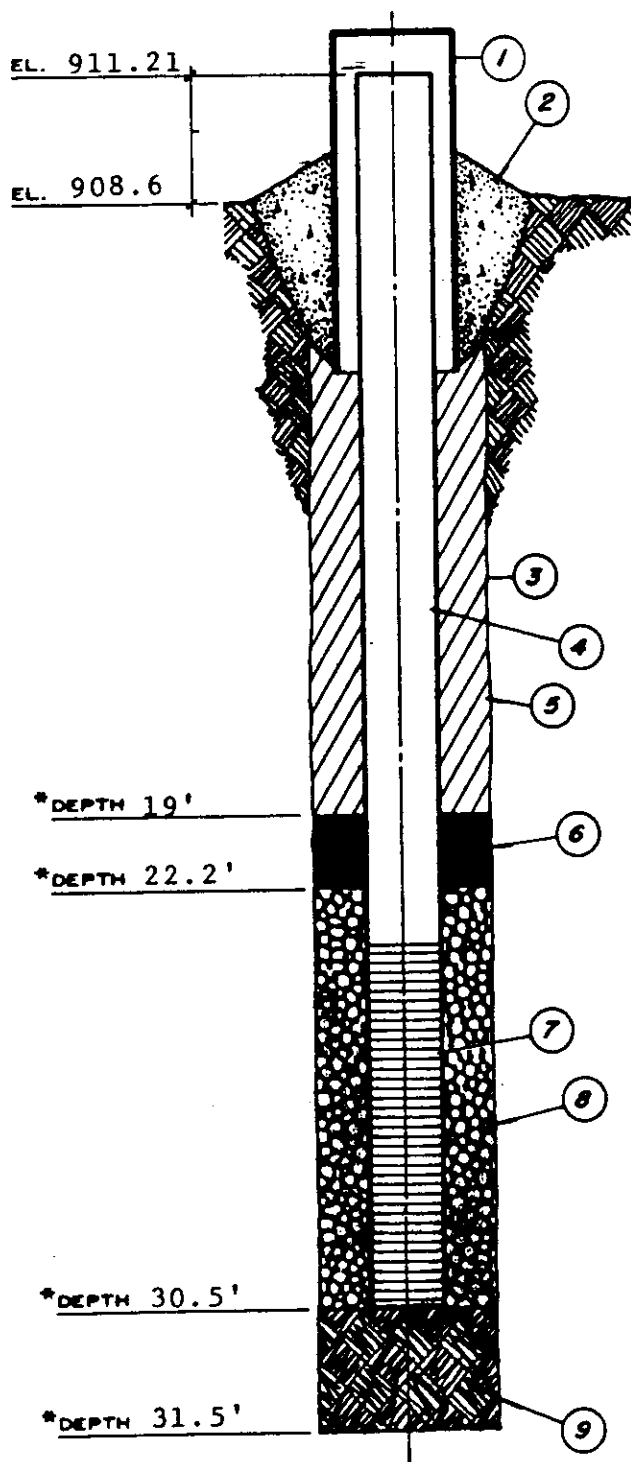
8. SCREEN FILTER TYPE #5 silica sand

9. BACKFILL TYPE natural material

undisturbed

MONITOR WELL COMPLETION REPORT :

WELL № MP211BR JOB № 321-081
 PROJECT CECOS International-Aber Road
 installed 12/12/86



*all depths measured from ground surface.

1. PROTECTIVE CASING I.D. 8 INCHES.
2. SURFACE SEAL TYPE 5% bentonite grout
3. BOREHOLE DIAMETER 10 INCHES.
4. RISER PIPE:
 - a. Type 304 stainless-steel
 - b. I.D. 4 INCHES
 - c. Length 27 FEET
 - d. Joint Type flush thread coupled
5. BACKFILL:
 - a. Type 5% bentonite grout
 - b. Installation side discharge tremie
6. Type of SEAL 3/8-in. bentonite pellets
7. SCREEN
 - a. Type 304 stainless-steel
 - b. I.D. 4 INCHES
 - c. Slot Size 0.010 INCHES
 - d. Length 5 FEET
8. SCREEN FILTER TYPE #5 silica sand
9. BACKFILL TYPE native fill



THE H. C. NUTTING COMPANY

GEOTECHNICAL AND TESTING ENGINEERS

SINCE 1921

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BOX NUMBER 11 • HIGHLAND HEIGHTS, KENTUCKY 41076 • 606-261-2043

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5-1-85 vf
P.O.#1615

TEST BORING REPORT

CLIENT CECOS International, Inc. ORDER No. 8454.025
PROJECT Installation of Monitoring Wells, Aber Road Facility, HOLE No. 212-A
Clermont County, Ohio
LOCATION 5' East of MP212
DRILLER W. Shanks/Ins. T. Tripp DRILL No. 34 DATE STARTED 4-1-84
ELEVATION REFERENCE Provided by client DATE COMPLETED 4-1-84
CASING: DIAMETER 6" I. D. Auger HAMMER WT. FALL
SAMPLER: DIAMETER & TYPE 2" O. D. Split Spoon HAMMER WT. 300# FALL 30"
DEPTH TO WATER: IMMEDIATE UPON COMPLETION
DEPTH TO WATER DAYS AFTER COMPLETION WATER USED IN DRILLING

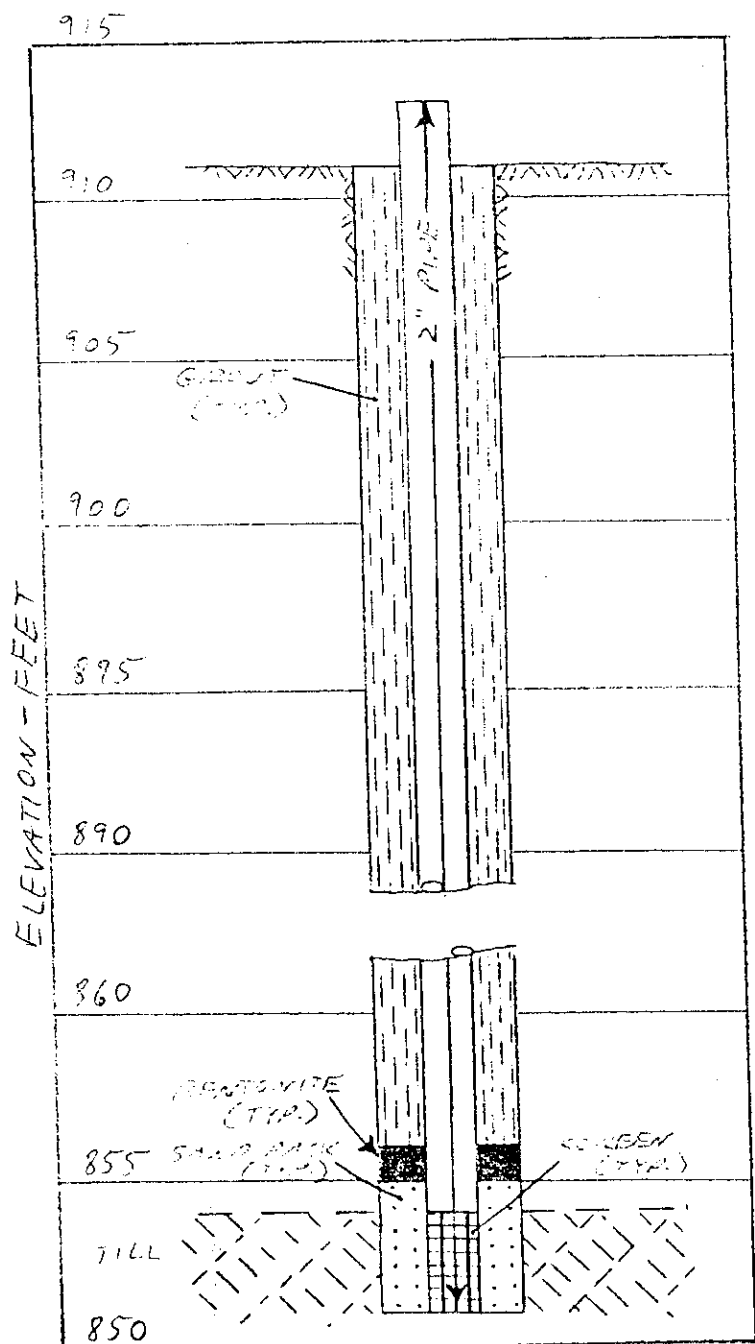
ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
911.6	0'						
		No samples-augered					
891.6	20.0'		1	20-21.5	SS	20-30-45	18"
		3.5' Gray sandy silty clay with gravel and rock fragments, moist - hard	2	21.5-23	SS	16-52-85	18"
			3	23-24.5	SS	20-34-74	18"
888.1	23.5'						
		0.5' Gray silty fine sand, trace of coarse sand and fine gravel, (wet seam at 23.5'), very moist - very dense					
887.6	24.0'		4	24.5-26	SS	3-12-28	16"
		2.0' Gray sandy silty clay with gravel and rock fragments, moist - hard					
885.6	26.0'						
		BORING COMPLETED					
		Backfilled 26.0'-24.0'					
		Set 1' (4") well screen 24.0'-23.0'					
		Set 2.5' sand pack 24.0'-21.5'					
		Set 1' Bentonite seal 21.5'-20.5'					
		Grouted from 21.5'-0'					
		Used 26' (4") PVC screen and pipe					

Respectfully submitted,

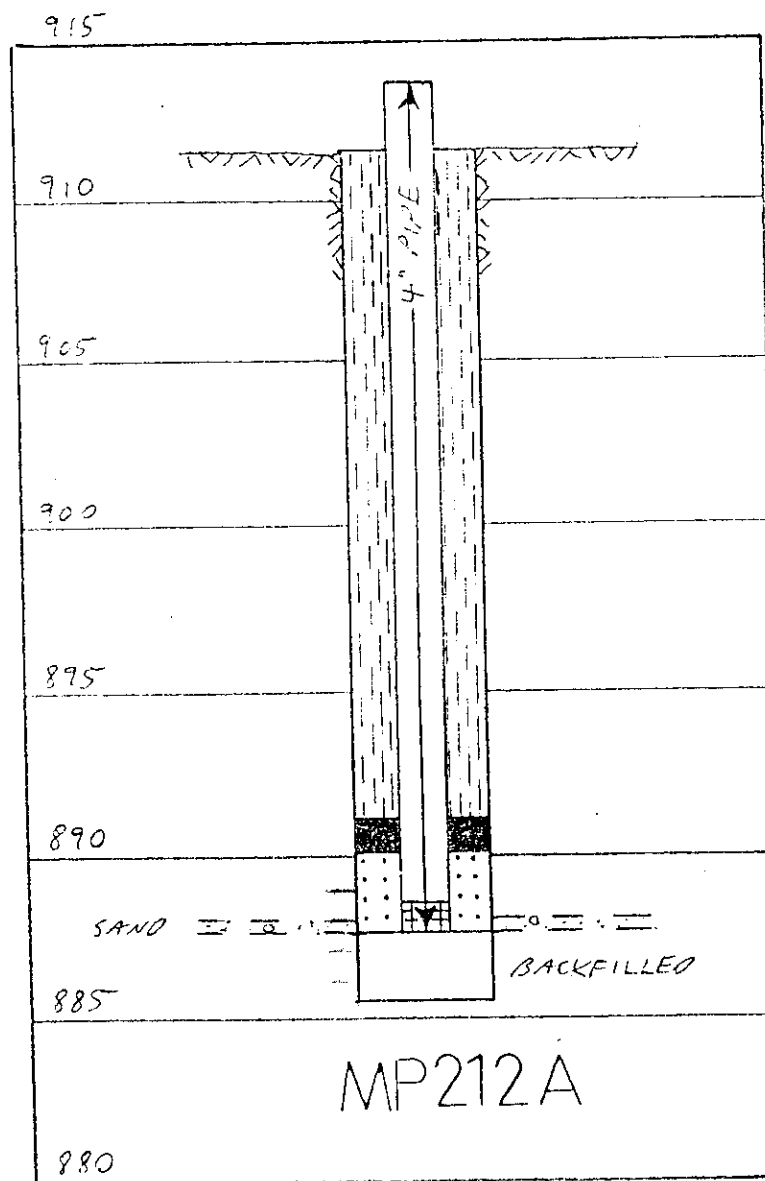
THE H. C. NUTTING CO.

M. F. V. [Signature]

Samples recovered from this test boring are available for inspection, which is strongly recommended. The company assumes no responsibility for interpretation.



MP212





THE H. C. NUTTING COMPANY

GEOTECHNICAL AND TESTING ENGINEERS

SINCE 1921

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5-2-84 vf
P. O. #1615

TEST BORING REPORT

CLIENT CECOS International, Inc. ORDER No. 8454.025

PROJECT Installation of Monitoring Wells, Aber Road Facility, HOLE No. MP212D
Clermont County, Ohio

LOCATION 8' southeast of MP212

DRILLER H. Herd/Ins. E. Alder DRILL No. 37 DATE STARTED 4-7-84

ELEVATION REFERENCE Provided by client DATE COMPLETED 4-7-84

CASING: DIAMETER 6" I. D. Hollow Stem Auger HAMMER WT. FALL

SAMPLER: DIAMETER & TYPE 2" O. D. Split Spoon HAMMER WT. 300# FALL 30"

DEPTH TO WATER: IMMEDIATE 33.5' UPON COMPLETION

DEPTH TO WATER DAYS AFTER COMPLETION WATER USED IN DRILLING

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
910.6	0'						
		28.5' Augered - no samples					
882.1	28.5'	5.0' Gray sandy silty clay with gravel and rock fragments, moist - hard	1	28.5-30	SS	90-154-288	18"
			2	30-31.5	SS	71-160-268	18"
			3	31.5-33	SS	46-119-424	18"
			4	33-33.5	SS	-58-	6"
877.1	33.5'	1.5' Gray fine to coarse sand and gravel with silty seams, wet - very dense	5	33.5-34.5	SS	170-450	12"
			6	34.5-35	SS	-120-	6"
875.6	35.0'	0.5' Gray sandy silty clay with gravel and rock fragments, moist - hard	7	35-35.5	SS	-151-	5"
875.1	35.5'	Set 1.5' (4") well screen 35.0'-33.0' Set 2.5' sand pack 35.0'-32.5' Set 1' Bentonite seal 32.5'-31.5' Grouted from 31.5'-0' 2' stick up Used 37' (4") PVC screen and pipe					

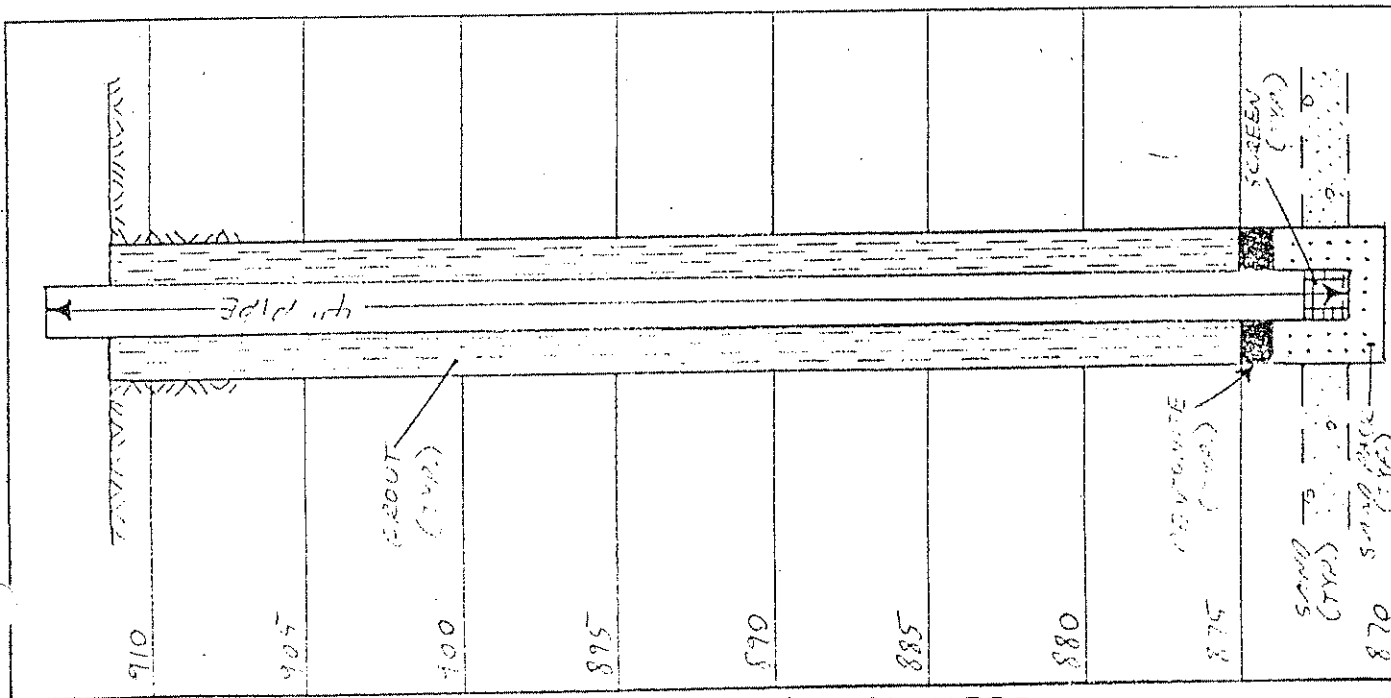
Respectfully submitted,

THE H. C. NUTTING CO.

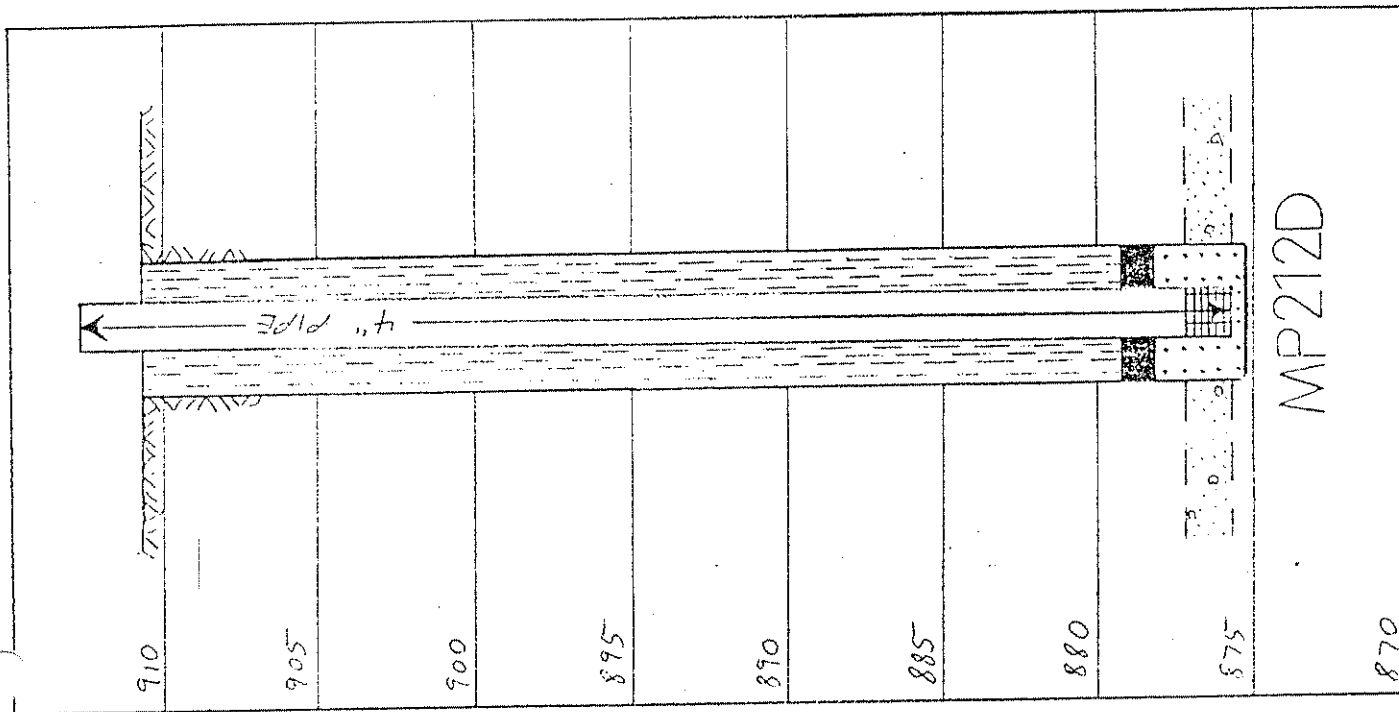
By M. F. [Signature]

Samples recovered from this test boring are available for inspection, which is strongly recommended. The company assumes no responsibility for interpretations made by others of load bearing, stability, excavating or other physical characteristics of materials penetrated in the boring.

ELEVATION - FEET



MP212C



MP212D



THE H. C. NUTTING COMPANY

GEOTECHNICAL AND TESTING ENGINEERS

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6-5-84 vf
P.O.#1615

TEST BORING REPORT

CLIENT CECOS International, Inc. ORDER No. 8454.025
PROJECT Installation of Monitoring Wells, Aber Road Facility, HOLE No. MP213A
Clermont County, Ohio
LOCATION 5' north of MP 213

DRILLER W. Martin DRILL No. 36 DATE STARTED 5-24-84
Inspector - B. Johnson
ELEVATION REFERENCE Provided by client DATE COMPLETED 5-24-84
CASING: DIAMETER 6" Hollow Stem Auger
SAMPLER: DIAMETER & TYPE 2" O. D. Split Spoon HAMMER WT. 300# FALL 30"
DEPTH TO WATER: IMMEDIATE 23.5' UPON COMPLETION
DEPTH TO WATER DAYS AFTER COMPLETION WATER USED IN DRILLING

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
908.4	0'						
		17.5' Augered to 17.5' no sampling.					
890.9	17.5'	4.5' Gray silty sandy clay with gravel and rock fragments, moist - stiff	1 2 3	17.5-19 19-20.5 20.5-22	SS SS SS	5-8-9 6-8-11 5-9-13	18" 18" 18"
886.4	22.0'	1.5' Brown silty sandy clay with gravel and rock fragments	4	22-23.5	SS	7-12-26	18"
884.9	23.5'	5.5' Gray fine to coarse sand and gravel, wet - dense	5 6 7 8	23.5-25 25-26.5 26.5-28 28-29	SS SS SS SS	8-12-13 10-16-20 9-12-9 5-15	18" 18" 18" 12"
879.4	29.0'	0.5' Gray sandy silty clay with gravel and rock fragments, moist - stiff	9	29-29.5	SS	32	6"
878.9	29.5'	Set 5' (4") well screen 29.0'-24.0' Set 7' sand pack 29.0'-22.0' Set 1' Bentonite seal 22.0'-21.0' Grouted 21.0'-0' 2' stick up Used 31.0' (4") PVC screen and pipe					

Respectfully submitted,

Samples recovered from this test boring are available for inspection.

THE H. C. NUTTING COMPANY

74BR

TEST BORING RECORD

Sheet 1 of 1

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Location Williamsburg, Ohio

Started 12/20/85 Completed 12/20/85 Job No. 85147-1

Sampler Size 2 in O.D. Casing Size 8 in.

[illegible]

May 1986

TEST BORING RECORD

Water Level

1 hr. 24 hrs.

[illegible]

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Sampler Size 2 in O.D. Casing Size 8 in.

Hole No. 214A

1431

Surface
Elevation

Steel 1 6 1

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Started 12/20/85

Completed 12/20/85 Job No. 85147-1

[illegible]

May 1986

PITTSBURGH, PA. 15220

TEST BORING RECORD

Water Level

1508

Surface
Elevation

Sheet 1 of 1

CECOS Aber Road Facility

Williamsburg, Ohio

Started 12/20/85

Completed 12/20/85 Job No. 85147-1

Casing Hammer Wt.	lb _s	Drop	in.
-------------------	-----------------	------	-----

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Sampler Size 2 in O.D. Casing Size 8 in.

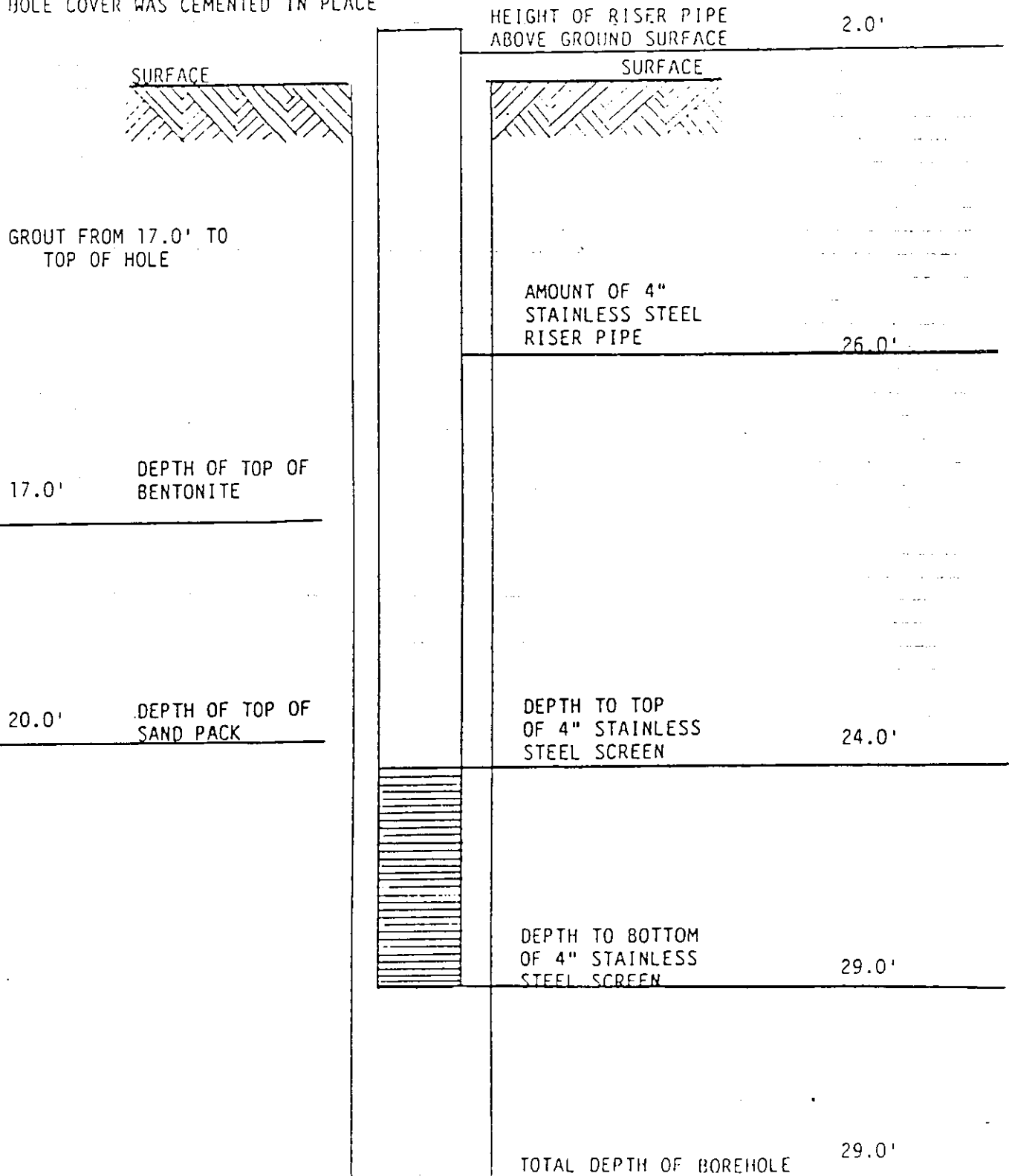
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MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 214A

DATE COMPLETED 12/20/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE



PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

TEST BORING RECORD

Driller James McCann
Water Level
1 hr. 9.0' 24 hrs.
Casing Hammer Wt. lbs. Drop
Sampler Hammer Wt. 140 lbs. Drop 30 in.
Sampler Size 2 in O.D. Casing Size 8 in.

Hole No. 214
Surface Elevation
Browning-Ferris Industries, Inc.
CECOS Aber Road Facility
Williamsburg, Ohio
Location
Started 11/6/85 Completed 11/7/85 Job No. 85147-1

Sheet 1 of 2

ELEVATION	DEPTH	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/6" Penetration on Sampler
40.1	0.0						
	8.0		8.0' Soft Gray Silty Clay with Rock Fragments				
	15.0		7.0' Stiff Brown Silty Clay				
	20.0		5.0' Stiff Gray Silty Clay with Limestone				
	28.0		8.0' Very Stiff Gray Silty Clay				
	33.0		5.0' Soft Gray Sand Silt, Wet				
	50.0		27.0' Very Stiff Gray Silty Clay with Some Limestone, Gravel				

(Continued)

Field Number MP-214R
May 1986

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

TEST BORING RECORD

Driller James McCann

Hole No. 214
For

Surface
Elevation

Sheet 2 of 2

Browning-Ferris Industries, Inc.
CECOS Aber Road Facility
Williamsburg, Ohio

Water Level

1 hr. 24 hrs.

Casing Hammer Wt. lbs. Drop in. Location

Sampler Hammer Wt. 140 lbs. Drop 30 in. Started

Sampler Size 2 in O.D. Casing Size 8 in. Completed

Job No. 85147-1

ELEVATION	DEPTH	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/6" Penetration on Sampler
	50.0		(Contd)				
			Very Stiff Gray Silty Clay with Some Limestone, Gravel				
	60.0		24.0' Very Stiff Gray Clay, Silt				
			Pressure Test from 70.0' to 84.0'			71.5	43-28-59
						76.5	35-48-59
						81.5	40-18-46
	84.0				Core Rec.	84.0	
			12.0' Soft to Medium Hard Gray Clay Shale with Limestone Seams		53%	87.0	
					40%	90.0	
					70%	94.0	
	96.0		6" Hole from 84.0' to 96.0'			96.0	

Field Number MP-214R
May 1986

MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 214

DATE COMPLETED 11/7/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE

HEIGHT OF RISER PIPE
ABOVE GROUND SURFACE 2.0'

SURFACE

SURFACE

GROUT FROM 81.0' TO
TOP OF HOLE

AMOUNT OF 4"
STAINLESS STEEL
RISER PIPE 91.0'

SAND FROM 83.0' TO 81.0'

83.0' DEPTH OF TOP OF
BENTONITE

85.0' DEPTH OF TOP OF
SAND PACK

DEPTH TO TOP
OF 4" STAINLESS
STEEL SCREEN 89.0'

DEPTH TO BOTTOM
OF 4" STAINLESS
STEEL SCREEN 94.0'

TOTAL DEPTH OF BOREHOLE 96.0'



THE H. C. NUTTING COMPANY

GEOTECHNICAL AND TESTING ENGINEERS

SINCE 1921

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6-5-84 vf
P.O.#1615
Page 1 of 2

TEST BORING REPORT

CLIENT CECOS International, Inc. ORDER No. 8454.025
PROJECT Installation of Monitoring Wells, Aber Road Facility, HOLE No. MP215A
Clermont County, Ohio
LOCATION 5' south of MP 215

DRILLER W.Martin DRILL No. 36 DATE STARTED 5-20-84
Inspector - B. Johnson

ELEVATION REFERENCE _____ DATE COMPLETED 5-20-84

CASING: DIAMETER 6" Hollow Stem Auger HAMMER WT. _____ FALL _____

SAMPLER: DIAMETER & TYPE 2" O. D. Split Spoon HAMMER WT. 300# FALL 30"

DEPTH TO WATER: IMMEDIATE 17.0' UPON COMPLETION _____

DEPTH TO WATER _____ DAYS AFTER COMPLETION _____ WATER USED IN DRILLING _____

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
907.2	0'						
		12.0' Augered to 12.0' - no samples taken					
895.2	12.0'	3.5' Gray silty sandy clay with gravel and rock fragments, moist - hard	1	12.5-14	SS	10-16-17	18"
			2	14-15.5	SS	11-13-20	18"
891.7	15.5'	2.8' Brown fine to coarse sand with fine gravel, moist - very dense	3	15.5-17	SS	9-16-27	18"
			4	17-18.5	SS	10-30-45	18"
888.9	18.3'	0.7' Gray sandy silt, moist - very dense	5	18.5-19	SS	17	6"
888.2	19.0'	2.0' Gray sandy silty clay with fine gravel, moist - hard	6	19-20	SS	38-49	9"
			7	20-21	SS	27-52	12"
886.2	21.0'						
		BORING COMPLETED					

Respectfully submitted,

THE H. C. NUTTING CO.

M. H. Nutting

Samples recovered from this test boring are available for inspection, which is strongly recommended. The company assumes no responsibility for interpretation.

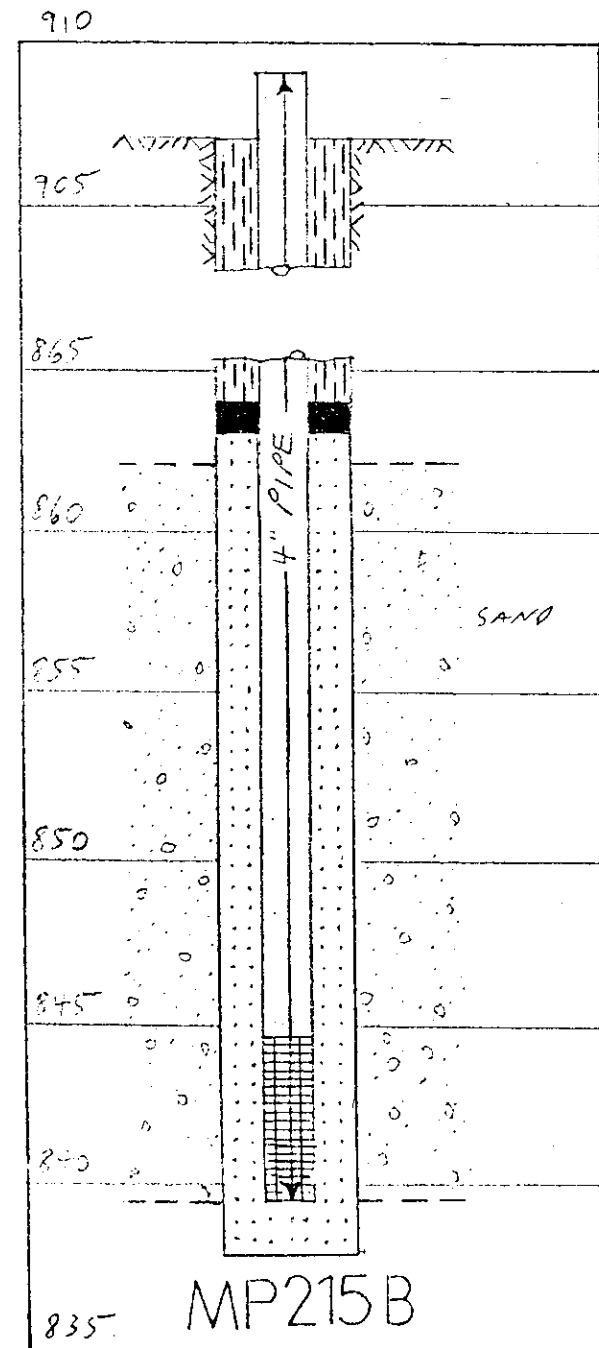
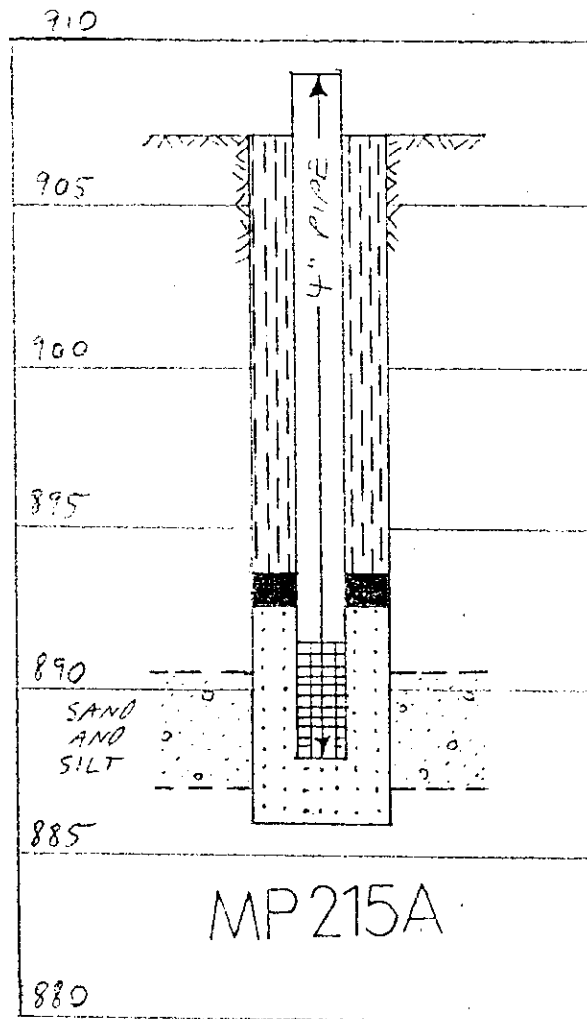
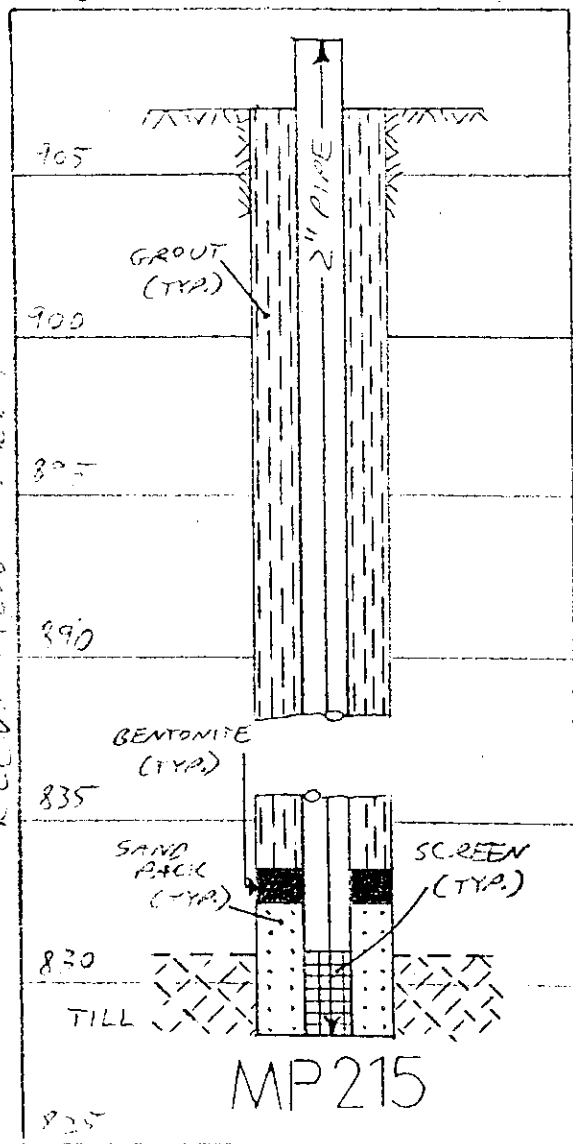
PROJECT Installation of Monitoring Wells, Aber Road Facility, HOLE No. MP215A
Clermont County, Ohio

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
		Set 3.5' (4") well screen 19.0'-15.5' Set 4.5' sand pack 19.0'-14.5' Set 1.0' Bentonite seal 14.5'-13.5' Grouted from 13.5'-0' 2' stick up Used 21.0' (4") PVC screen and pipe					

1.1

19.6

ELEVATION - FEET



Field Number MP-215BR

May 1986

PENNSYLVANIA DRILLING COMPANY

PITTSBURGH, PA. 15220

TEST BORING RECORD

Driller Peter E. Martin

Hole No.
For215-B Surface
Elevation

Sheet 1 of 2

Water Level

Browning-Ferris Industries, Inc.

1 hr. 24 hrs.

CECOS Aber Road Facility

Casing Hammer Wt. lbs. Drop in.

Location

Williamsburg, Ohio

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Started

11/22/85

Completed

11/25/85

Job No. 85147-1

Sampler Size 2 in O.D. Casing Size 8 in.

ELEVATION	DEPTH 0.0	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/6" Penetration on Sampler
			8" Auger - No Sampling				
	40.0					40.0	42-50/.4'
	46.5		6.5' Sandy Clay with Rock Fragments, Gray, Dry, Stiff to Medium Stiff			46.5	17-36-45
	50.0		9.8' Sand & Gravel (Blow Sand)				
			(Continued)				

May 1986

TEST BORING RECORD

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

Driller: Peter E. Martin

Water Level

1 hr. 24 hrs.

Casing Hammer Wt.	340	lbs.	Drop	20	in.
-------------------	-----	------	------	----	-----

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Sampler Size 2 in O.D. Casing Size 8 in.

215-B

Surface
Elevation

Sheet 2 of 2

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Job No. 85147-1

Location
Started

Completed

[illegible]

Field Number MP-215BR
May 1986

MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 215-B

DATE COMPLETED 11/25/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE

HEIGHT OF RISER PIPE
ABOVE GROUND SURFACE 2.0'

SURFACE

SURFACE

GROUT FROM 39.0' TO
TOP OF HOLE

AMOUNT OF 4"
STAINLESS STEEL
RISER PIPE 51.6'

39.0' DEPTH OF TOP OF
BENTONITE

DEPTH TO TOP
OF 4" STAINLESS
STEEL SCREEN 49.6'

42.0' DEPTH OF TOP OF
SAND PACK

DEPTH TO BOTTOM
OF 4" STAINLESS
STEEL SCREEN 54.6'

TOTAL DEPTH OF BOREHOLE 58.0'

Field Number MP216 BR
May 1986

TEST BORING RECORD

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

Driller Peter E. Martin

Water Level

1 hr.	24 hrs.
100	100
90	90
80	80
70	70
60	60
50	50
40	40
30	30
20	20
10	10
0	0

Casing Hammer Wt. 340 lbs. Drop

Sampler Hammer Wt. 140 lbs. Drop 30

Sampler Size 2 in O.D. Casing Size 8

Hole No. _____
for _____

216-B

Surface
Elevation

Sheet

of

1

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Location

Started 11/22/85

Completed 11/22/85

Job No. 85147-1

ELEVATION	DEPTH 0.0	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/6" Penetration on Sampler
			19.0' 8" Auger - No Sampling				
	19.0		5.5' Sandy Clay with Rock Fragments, Gray, Dry, Stiff			20.0	33-50/.5
	24.5		7.5' Sand & Gravel			24.5	50/.5'
	32.0					29.7	35-50/.2

Field Number MP-216BR
May 1986

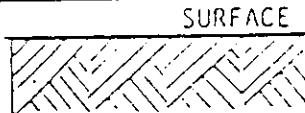
MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 216-B

DATE COMPLETED 11/22/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE

HEIGHT OF RISER PIPE
ABOVE GROUND SURFACE 2.0'



GROUT FROM 21.0' TO
TOP OF HOLE

AMOUNT OF 4"
STAINLESS STEEL
RISER PIPE 27.0'

21.0' DEPTH OF TOP OF
BENTONITE

23.0' DEPTH OF TOP OF
SAND PACK

DEPTH TO TOP
OF 4" STAINLESS
STEEL SCREEN 25.0'

DEPTH TO BOTTOM
OF 4" STAINLESS
STEEL SCREEN 30.0'

8" HOLE

TOTAL DEPTH OF BOREHOLE 32.0'



THE H. C. NUTTING COMPANY

GEOTECHNICAL AND TESTING ENGINEERS

SINCE 1921

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TEST BORING REPORT

5-31-84 vf
P.O. #1615
Page 1 of 2

CLIENT CECOS International, Inc. ORDER No. 8454.025
PROJECT Installation of Monitoring Wells, Aber Road Facility, HOLE No. MP217A
Clermont County, Ohio
LOCATION 10' north of MP217

DRILLER H. Herd DRILL No. _____ DATE STARTED 5-19-84
Inspector - E. Alder
ELEVATION REFERENCE Provided by client DATE COMPLETED 5-20-84
CASING: DIAMETER 6" I. D. Hollow Stem Auger HAMMER WT. _____ FALL _____
SAMPLER: DIAMETER & TYPE 2" O. D. Split Spoon HAMMER WT. 300# FALL 30"
DEPTH TO WATER: IMMEDIATE _____ UPON COMPLETION _____
DEPTH TO WATER _____ DAYS AFTER COMPLETION _____ WATER USED IN DRILLING _____

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recover
896.3	0'						
	3.0'	Brown clayey silt with organics, moist - soft	1	0-1.5	SS	1-2-2	18"
			2	1.5-3	SS	2-2-2	18"
893.3	3.0'		3	3-4.5	SS	6-12-25	18"
	8.0'	Brown silty sandy clay with gravel and rock fragments, moist - hard	4	8-9.5	SS	9-14-27	18"
		Augered 4.5' to 8.0' no samples	5	9.5-11	SS	16-17-41	18"
885.3	11.0'		6	11-12.5	SS	20-34-45	18"
	1.5'	Gray silty sandy clay with gravel and rock fragments, moist - hard					
883.8	12.5'		7	12.5-14	SS	8-13-16	16"
	2.0'	Gray silty fine to coarse sand and gravel, wet - very dense	8	14-14.5	SS	12	6"
881.8	14.5'						

Respectfully submitted,

THE H. C. NUTTING CO.

Samples recovered from this test boring are available for inspection, which is

77A

5-31-84 vf
Page 2 of 2

PROJECT Installation of Monitoring Wells, Aber Road Facility, HOLE No. MP211A
Clermont County, Ohio

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER 5' X 10% Rec	RECOVER
881.8	14.5'						
		1.0' Gray silty sandy clay with gravel and rock fragments, moist - hard	9	14.5-15.5	SS	19-20	12"
880.8	15.5'	(1) Set 2' (4") well screen 14.5'-12.5' Set 3' gravel pack 14.5'-11.5' Set 1' Bentonite seal 11.5'-10.5' Grouted 10.5' to surface 2' stick up Used 16.5' (4") PVC screen and pipe					



THE H. C. NUTTING COMPANY

GEOTECHNICAL AND TESTING ENGINEERS

SINCE 1921

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912 MORRIS STREET • CHARLESTON, WEST VIRGINIA 25301 • 304-344-0821
BOX NUMBER 11 • HIGHLAND HEIGHTS, KENTUCKY 41076 • 806-261-2043

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5-31-84 vf
P.O.#1615

Page 1 of 2

TEST BORING REPORT

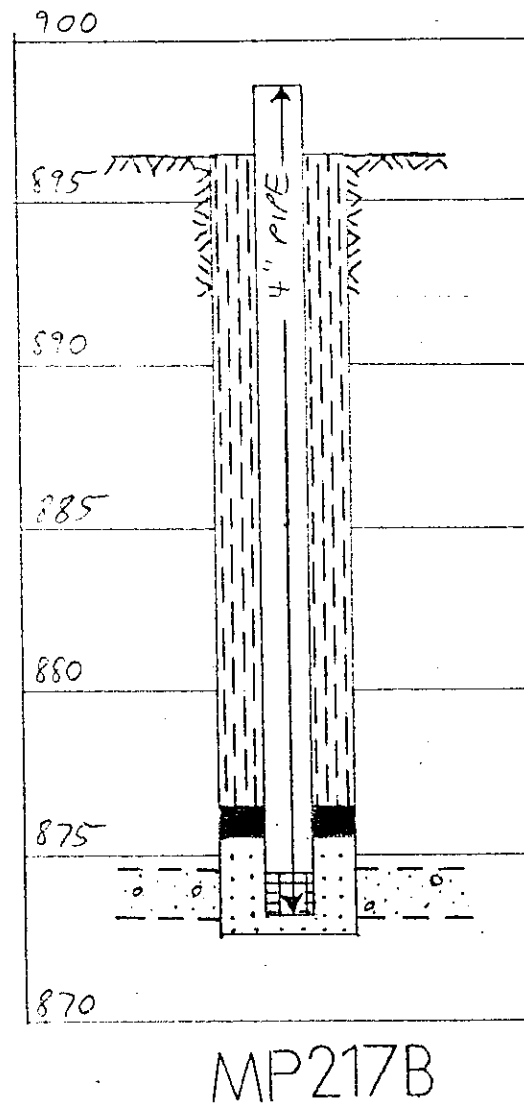
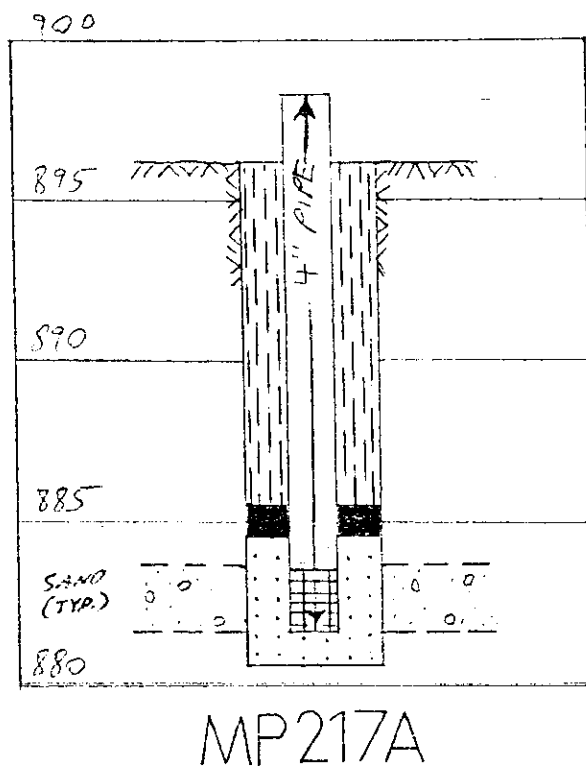
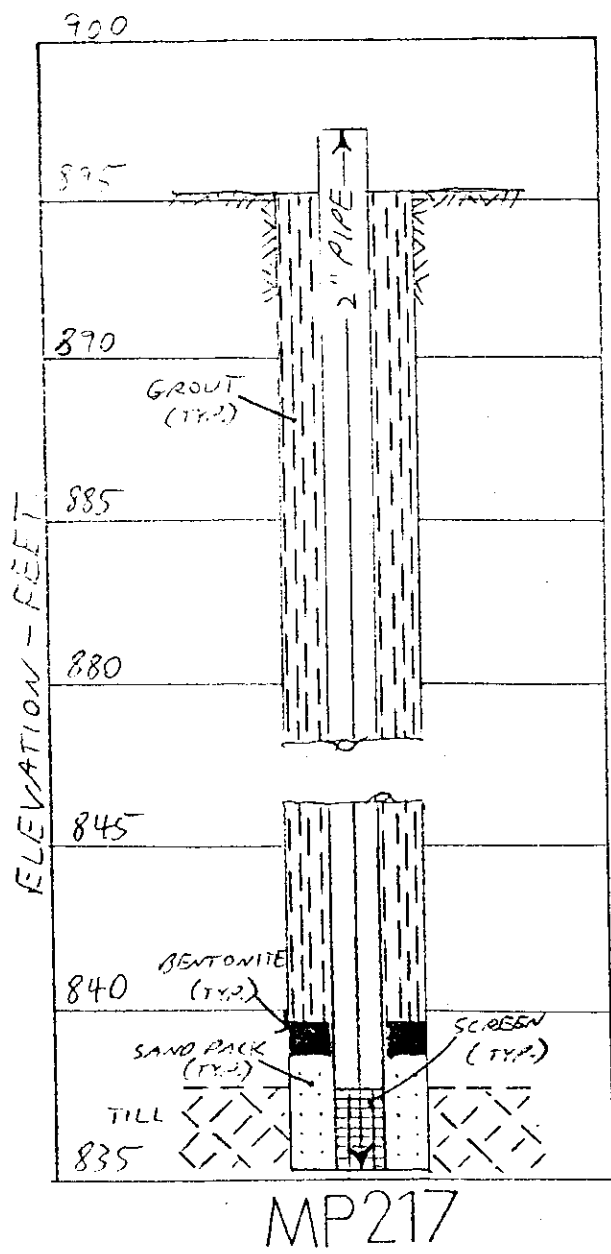
CLIENT CECOS International, Inc. ORDER No. 8454.025
PROJECT Installation of Monitoring Wells, Aber Road Facility, HOLE No. MP217B
Clermont County, Ohio
LOCATION 15' north of MP217
DRILLER H. Herd DRILL No. _____ DATE STARTED 5-20-84
Inspector - E. Alder DATE COMPLETED 5-21-84
ELEVATION REFERENCE Provided by client
CASING: DIAMETER 6" I. D. Hollow Stem Auger HAMMER WT. _____ FALL _____
SAMPLER: DIAMETER & TYPE 2" O. D. Split Spoon HAMMER WT. 300# FALL 30"
DEPTH TO WATER: IMMEDIATE _____ UPON COMPLETION _____
DEPTH TO WATER _____ DAYS AFTER COMPLETION _____ WATER USED IN DRILLING _____

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
896.6	0'						
	1.5'	Brown silty clay with organics (fill), moist - soft	1	0-1.5	SS	1-1-1	5"
895.1	1.5'		2	1.5-3	SS	5-6-9	15"
	3.0'	Brown silty sandy clay with gravel and rock fragments, moist - hard	3	3-4.5	SS	13-19-25	18"
892.1	4.5'						
	10.5'	Augered to 15.0' and started sampling					
881.6	15.0'		4	15-15.5	SS	16	6"
	0.5'	Brown silty fine to coarse sand and gravel, wet - very dense					
881.1	15.5'		5	15.5-16.5	SS	35-35	12"
	6.5'	Gray silty sandy clay with gravel and rock fragments, moist - hard	6	16.5-18	SS	14-16-33	18"
			7	18-19.5	SS	12-16-24	18"
			8	19.5-21	SS	18-21-26	18"
			9	21-22	SS	28-36	12"
874.6	22.0'						

Respectfully submitted,
THE H. C. NUTTING CO.

PROJECT Installation of Monitoring Wells, Aber Road Facility. HOLE No. MP217B
Clermont County, Ohio

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
874.6	22.0'						
		1.5' Gray silty fine to coarse sand and gravel, moist - very dense	10	22-22.5	SS	68	6"
			11	22.5-23.5	SS	22-24	12"
873.1	23.5'	0.5' Gray silty sandy clay with gravel and rock fragments, moist - hard	12	23.5-24	SS	27	6"
872.6	24.0'	Set 1 1/2' (4") well screen 23.5'-22.0' Set 2 1/2' gravel pack 23.5' to 21.0' Set 1' Bentonite seal 23.5'-22.5' Grouted 22.5' to surface 2' stick up Used 25.5' (4") PVC screen and pipe					



Field Number MP-217 R
May 1986

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

TEST BORING RECORD

Driller James McCann

Hole No.

217

Surface
Elevation

Sheet

1

of

2

Water Level

For

Browning-Ferris Industries, Inc.

1 hr. 1.0 24 hrs.

CECOS Aber Road Facility

Casing Hammer Wt. lbs. Drop in.

Location

Williamsburg, Ohio

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Started 11/4/85

Completed 11/5/85

Job No. 85147-1

Sampler Size 2 in O.D. Casing Size 8 in.

ELEVATION	DEPTH	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/ft. Penetration on Sampler
	0.0						
	7.0		7.0' Brown Silty Clay with Limestone, Damp				
	17.0		10.0' Stiff Brown Silty Clay with Gravel				
	25.0		8.0' Soft Gray Sand with Gravel, Some Clay, Wet				
	40.0		15.0' Stiff Gray Silty Clay with Small Gravel, Damp				
	50.0		25.0' Very Stiff, Gray Silty Clay with Limestone, Fine Sand, Damp			45.0	26-47-62
			(Continued)			49.7	21-50-65

May 1986

PITTSBURGH, PA. 15220

Water Level

1 hr.

24 hrs.

Casing Hammer Wt.	lbs	Drop
-------------------	-----	------

Sampler Hammer Wt. 140 lbs. Drop 30

Sampler Size 2 in O.D. Casing Size 8

for

Surface
Elevation

Sheet 2 of 2

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Completed

Job No. 85147-1

ELEVATION	DEPTH	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/6" Penetration on Sampler
	50.0		(Contd)				
			Very Stiff, Gray Silty Clay with Limestone, Fine Sand, Damp			55.0	31-48-63
						60.0	15-37-46
	65.0					65.0	18-29-56
			4.0' Soft Gray Silty Shale with Clay Seams		Core Rec.		
	69.0				90%	69.0	
			6.0' Hard Gray Limestone with Clay Seams				
	75.0				90%	70.0	
			Reamed from 65.0' to 70.0' - 6"				

Field Number MP-217R
May 1986

MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 217

DATE COMPLETED 11/5/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE

HEIGHT OF RISER PIPE
ABOVE GROUND SURFACE 2.0'

SURFACE

SURFACE

GROUT FROM 56.0' TO
TOP OF HOLE

AMOUNT OF 4"
STAINLESS STEEL
RISER PIPE 64.5'

SAND FROM 57.0' TO 56.0'

57.0' DEPTH OF TOP OF
BENTONITE

DEPTH TO TOP
OF 4" STAINLESS
STEEL SCREEN 62.5'

59.0' DEPTH OF TOP OF
SAND PACK

DEPTH TO BOTTOM
OF 4" STAINLESS
STEEL SCREEN 64.5' ^{76.5'}

TOTAL DEPTH OF BOREHOLE 70.0'



THE H. C. NUTTING COMPANY

GEOTECHNICAL AND TESTING ENGINEERS

SINCE 1921

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BOX NUMBER 11 • HIGHLAND HEIGHTS, KENTUCKY 41076 • 606-261-2043

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5-4-84 vf

Page 1 of 2

P.O.#1615

TEST BORING REPORT

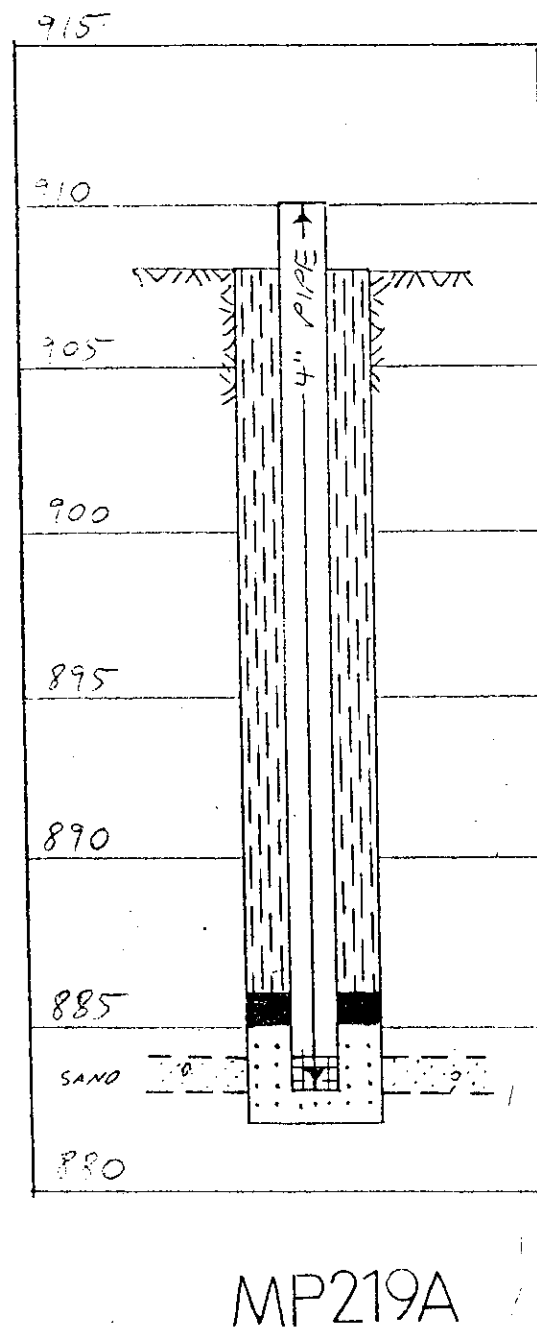
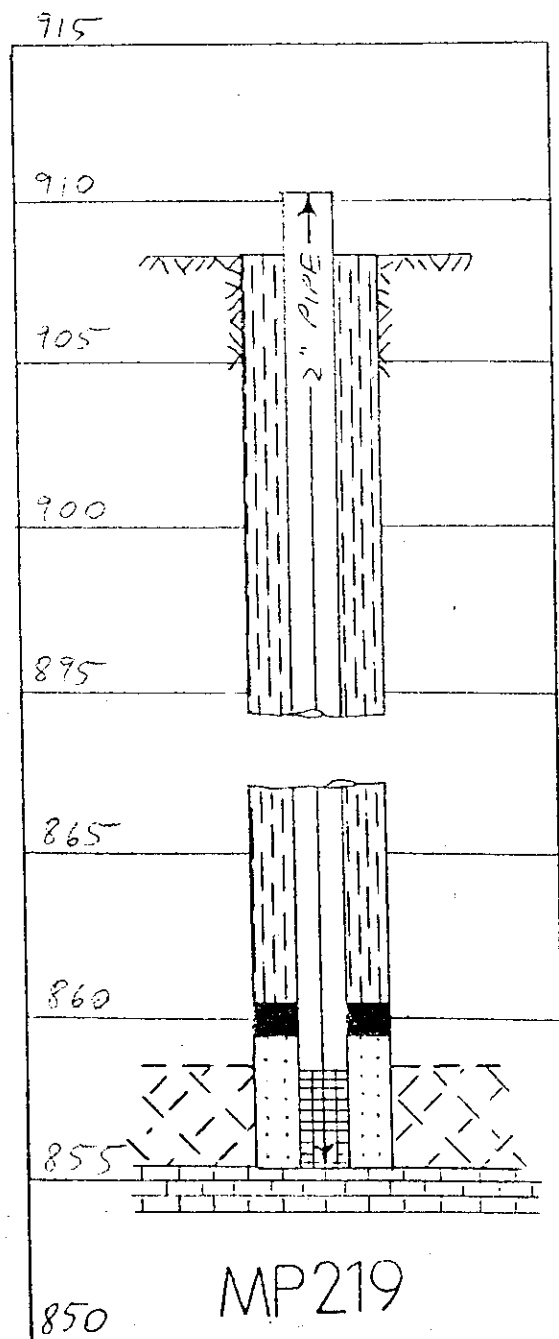
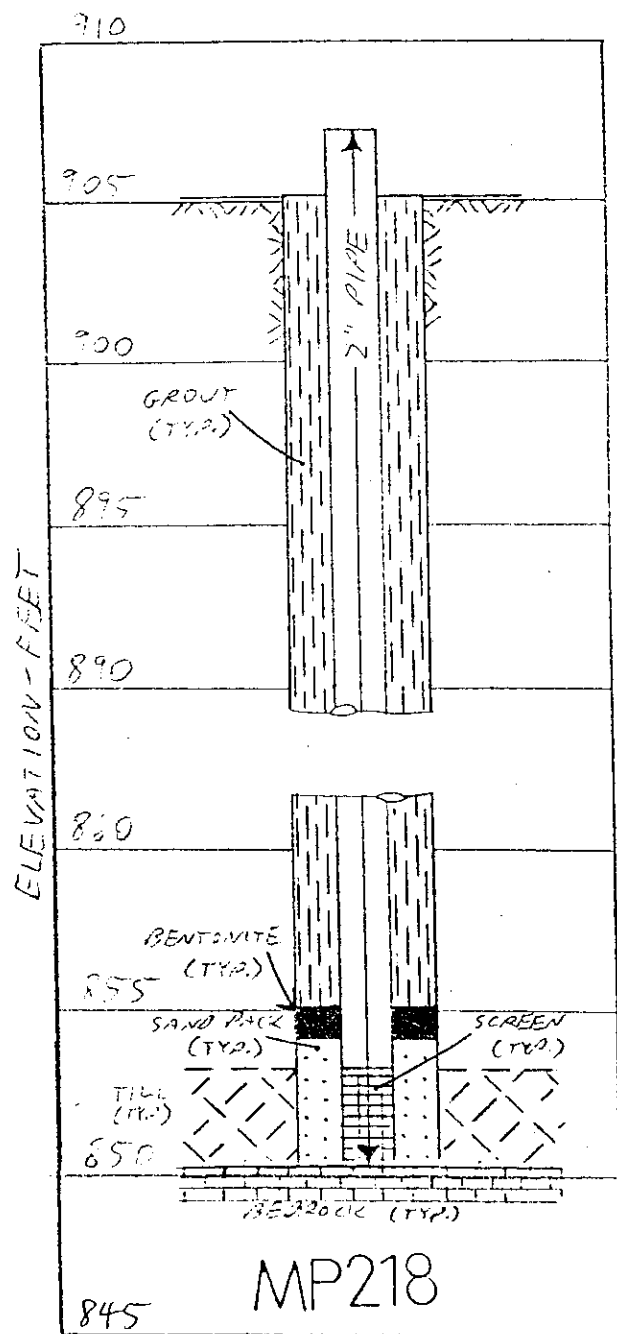
CLIENT CECOS International, Inc. ORDER No. 8454.025
PROJECT Installation of Monitoring Wells, Aber Road Facility, HOLE No. MP 219A
Clermont County, Ohio
LOCATION 5' west of MP 219
DRILLER W. Martin / Ins. B. Johnson DRILL No. 36 DATE STARTED 5-1-84
ELEVATION REFERENCE Provided by client DATE COMPLETED 5-1-84
CASING: DIAMETER 6" Hollow Stem Auger HAMMER WT. FALL
SAMPLER: DIAMETER & TYPE 2" O. D. Split Spoon HAMMER WT. 300# FALL 30"
DEPTH TO WATER: IMMEDIATE UPON COMPLETION
DEPTH TO WATER DAYS AFTER COMPLETION WATER USED IN DRILLING

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
908.1	0'						
		18.0' Augered to 18.0, no samples					
890.1	18.0'	1.5' Gray sandy silty clay with gravel and rock fragments, 1/2" sand seams, moist - stiff	1	18-19.5	SS	10-16-20	18"
888.6	19.5'	4.5' Brown sandy silty clay with gravel and rock fragments, moist - stiff to hard	2 3 4 5	19.5-21 21-22.5 22.5-23.5 23.5-24	SS SS SS SS	6-16-27 15-62-76 30-70 20	18" 18" 12" 4"
884.1	24.0'	1.0' Brown silty fine to coarse sand and gravel, moist - very dense	6 7	24-24.5 24.5-25	SS SS	80 40	6" 6"
883.1	25.0'						

Respectfully submitted,
THE H. C. NUTTING CO.

PROJECT Installation of Monitoring Wells, Aber Road Facility, HOLE No. MP 219A
Clermont County, Ohio

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
883.1	25.0'						
		1.0' Gray silty sandy clay with gravel and rock fragments, moist - hard	8	25-26	SS	24-35	12"
882.1	26.0'						
		BORING COMPLETED					
		Set 1' (4") well screen 25.0'-24.0'					
		Set 2' gravel pack 25.0'-23.0'					
		Set 1' Bentonite seal 23.0'-22.0'					
		Grouted 22.0' to surface					
		2' stick up					
		Used 27' (4") PVC screen and pipe					



May 1986

TEST BORING RECORD

Water Level

Casing Hammer Wt. lbs. Drop

Sampler Hammer Wt. 140 lbs. Drop 30

Sampler Size 2 in O.D. Casing Size 8

For

Sheet 1 of 1

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Location	Williamsburg, Ohio		
Started	11/4/85	Completed	11/4/85

Completed 11/4/85 Job No. 85147-1

[illegible]

May 1986

TEST BORING RECORD

PITTSBURGH, PA. 15220

Hole No. 220-A

Surface

Elevation

Sheet

1 of 1

For

Browning-Ferris Industries, Inc.

Location

CECOS Aber Road Facility

Started

Williamsburg, Ohio

Started 11/4/85

Completed 11/4/85

Job No. 85147-1

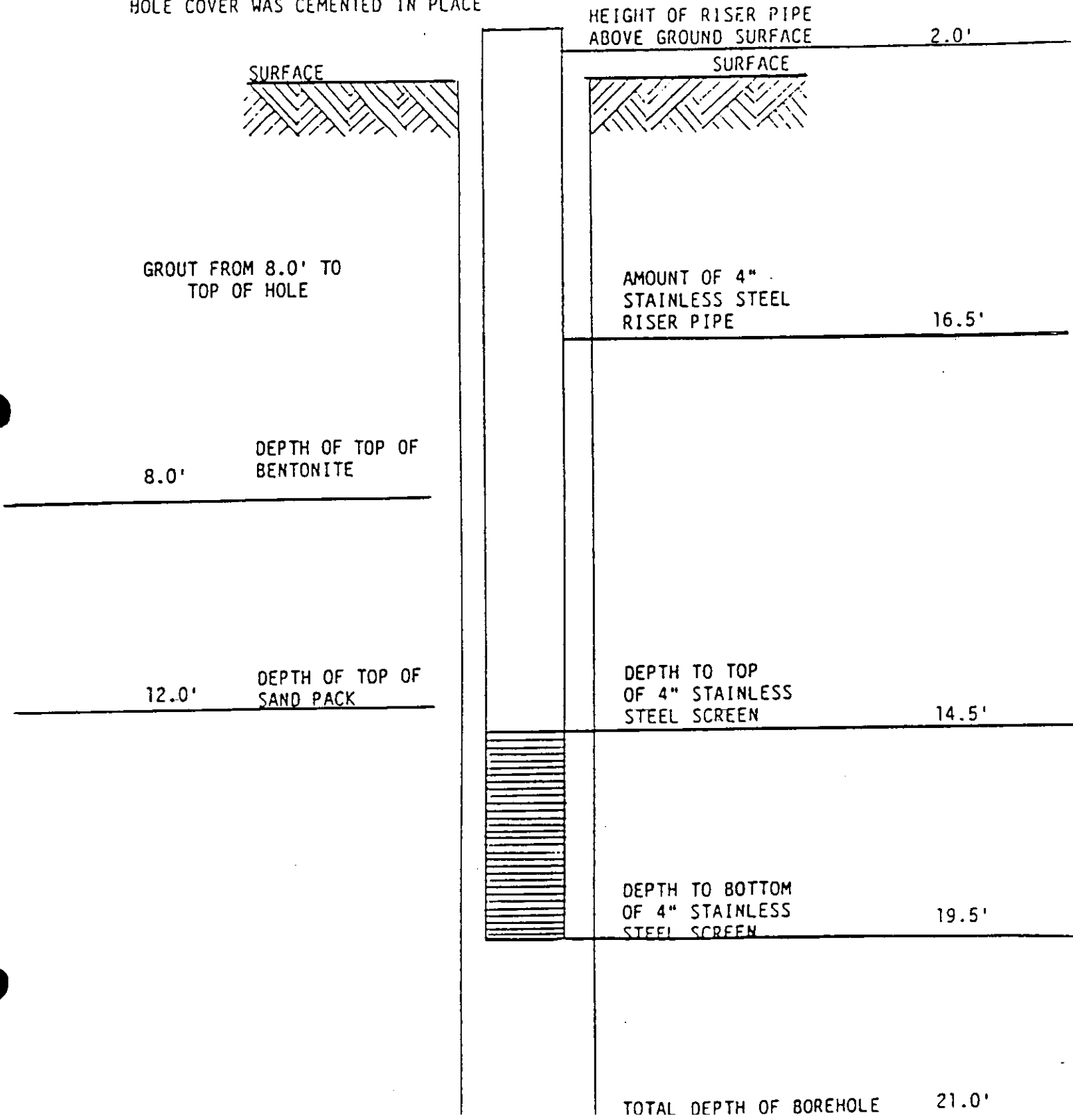
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MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 220-A

DATE COMPLETED 11/4/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE



TEST BORING RECORD

Driller William J. Saccani

1 hr. 24 hrs.

Casing Hammer Wt.	140	lbs	Drop	30	in.
-------------------	-----	-----	------	----	-----

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Sampler Size 2 in O.D. Casing Size 10 in.

Hole No.	221-A	Surface Elevation	Sheet	1	of	2
For	Browning-Ferris Industries, Inc. CECOS Aber Road Facility					
Location	Williamsburg, Ohio					
Started	11/17/85	Completed	11/21/85	Job No.	85147-1	

Location Williamsburg, Ohio

Started 11/17/85

Completed 11/21/85 Job No. 85147-1

[illegible]

Field Number MP-221R
May 1986

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

TEST BORING RECORD

Driller William J. Saccani

Water Level

1 hr. 24 hrs.

Casing Hammer Wt.	310	lbs.	Drop	30	in.
-------------------	-----	------	------	----	-----

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Sampler Size **2** in O.D. Casing Size in.

Hole No. 221-A Surface Elevation Sheet 2 of 2

For Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Location Williamsburg, Ohio

Started 11/17/85 Completed 11/21/85 Job No. 85147-1

11/17/83

Completed 11/21/85

Job No. 85147-1

[illegible]

Field Number MP-221R
May 1986

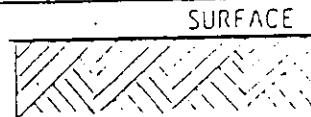
MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 221-A

DATE COMPLETED 11/21/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE

HEIGHT OF RISER PIPE
ABOVE GROUND SURFACE 2.0'



GROUT FROM 51.0' TO
TOP OF HOLE

AMOUNT OF 4"
STAINLESS STEEL
RISER PIPE 58.4'

51.0' DEPTH OF TOP OF
BENTONITE

52.0' DEPTH OF TOP OF
SAND PACK

DEPTH TO TOP
OF 4" STAINLESS
STEEL SCREEN 56.4'

DEPTH TO BOTTOM
OF 4" STAINLESS
STEEL SCREEN 61.4'

TOTAL DEPTH OF BOREHOLE 65.0'



THE H. C. NUTTING COMPANY

GEOTECHNICAL AND TESTING ENGINEERS

SINCE 1921

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5-2-84 vf
P.O.#1615

TEST BORING REPORT

CLIENT CECOS International, Inc. ORDER No. 8454.025

PROJECT Installation of Monitoring Wells, Aber Road Facility HOLE No. MP222B
Clermont County, Ohio

LOCATION 5' north of MP 222

DRILLER H. Herd / E. Alder DRILL No. 36 DATE STARTED 4-25-84

ELEVATION REFERENCE Provided by client DATE COMPLETED 4-25-84

CASING: DIAMETER 6" I. D. Hollow Stem Auger HAMMER WT. FALL

SAMPLER: DIAMETER & TYPE 2" O. D. Split Spoon HAMMER WT. 300# FALL 30"

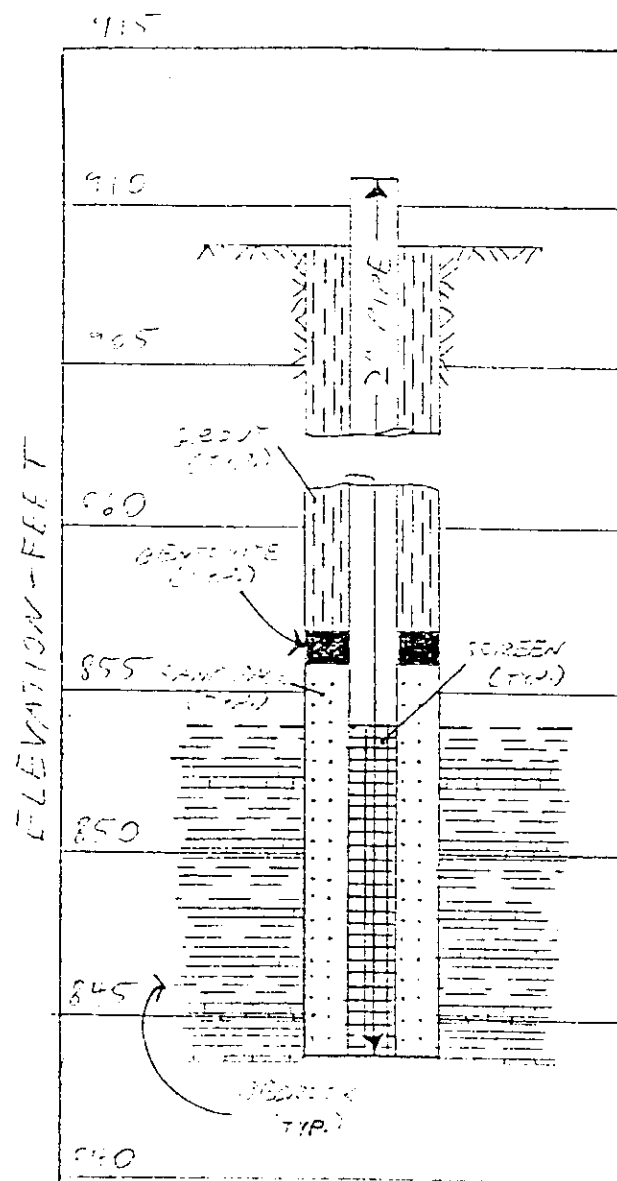
DEPTH TO WATER: IMMEDIATE UPON COMPLETION

DEPTH TO WATER DAYS AFTER COMPLETION WATER USED IN DRILLING

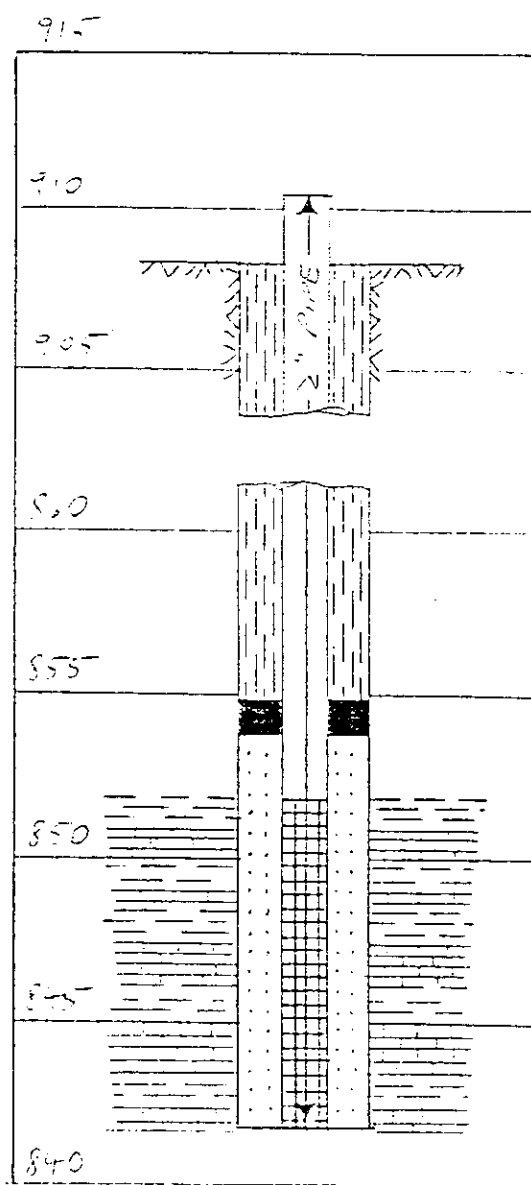
ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
908.5	0'						
		13.0' Augered to 13.0' and started sampling					
895.5	13.0'	3.0' Brown silty sandy clay with gravel and rock fragments, moist - hard	1	13-14.5	SS	13-22-23	18"
			2	14.5-16	SS	17-25-31	18"
892.5	16.0'	1.5' Gray silty sandy clay with gravel and rock fragments, moist - hard	3	16-17.5	SS	12-23-53	18"
891.0	17.5'	2.0' Brown silty fine to coarse sand and gravel, moist - very dense	4	17.5-19	SS	23-40-44	16"
			5	19-19.5	SS	15	6"
889.0	19.5'	0.5' Gray silty sandy clay with gravel and rock fragments, moist - hard	6	19.5-20	SS	17	6"
888.5	20.0'	Set 2' (4") well screen 19.5'-17.5' Set 3' sand pack 19.5'-16.5' Set 1' Bentonite seal 16.5'-15.5' Grouted 15.5' to surface 2' stick up Used 21.5' (4") PVC screen and pipe					

Samples recovered from this test boring are available for inspection, which is strongly recommended. The company assumes no responsibility for interpretation made by others of test boring results.

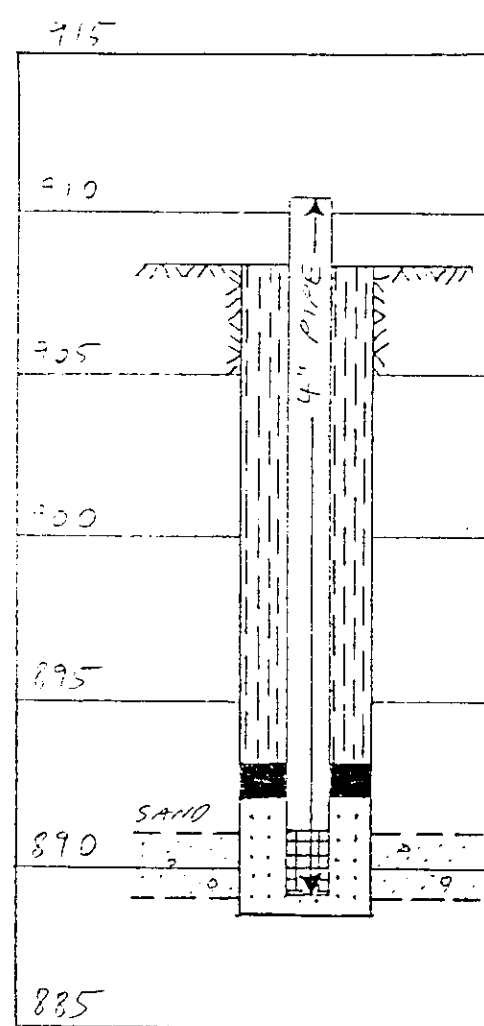
Respectfully submitted,
THE H. C. NUTTING CO.
[Signature]



MP221



MP222



MP222B

May 1986

TEST BORING RECORD

PITTSBURGH, PA. 15220

Duffy James McCann

Water Level

1 hr.

24 hrs.

Casing Hammer Wt. lbs. Drop

1b5. Drop

..

iii.

Sampler Hammer Wt. 140 lbs. Drop

the Drop

30

ін.

Sampler Size 2 in O.D. Casing Size 8

in O.D. Casing Size 8

8

in.

Hole No. 222

Surface
Elevation

Sheet 1 of 2

For Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Location Williamsburg, Ohio

Started 12/6/85

Completed 12/8/85

Job No. 85147-1

[illegible]

May 1986

TEST BORING RECORD

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

Driller James McCann

Water Level

1 hr. 24 hrs.

Casing Hammer Wt	140	lbs	Drop	30	in.
------------------	-----	-----	------	----	-----

Sampler Hammer wt. 140 lbs. Drop 30 in.

Sampler Size 2 in O.D. Casing Size 8 in.

Hole No. 222

4-42 F

Surface
elevation

Sheet 2

est 2

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Location

Started 12/6/85

Completed

12/8/85

Job No. 35147-1

[illegible]

TEST BORING RECORD

Driller William J. Saccani

Water Level

1 hr. 24 hrs.

Casing Hammer Wt.	340	lbs.	Drop	20	in.
-------------------	-----	------	------	----	-----

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Sampler Size 2 in O.D. Casing Size 8 in.

File No. 223-AR

Surface
Elevation

Sheet 1 of 1

For Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Location Williamsburg, Ohio

Started 11/8/85 Completed 11/10/85 Job No. 85147-1

ELEVATION	DEPTH 0.0	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/6" Penetration on Sampler
			29.0' Augered - No Sampling				
	29.0		12.0' Dark Gray Clayey & Sandy Silt with Rock Fragments, Very Dense			30.5	25-35-40
						34.8	55-50 / .3'
	41.0					39.7	55-60 / .2'

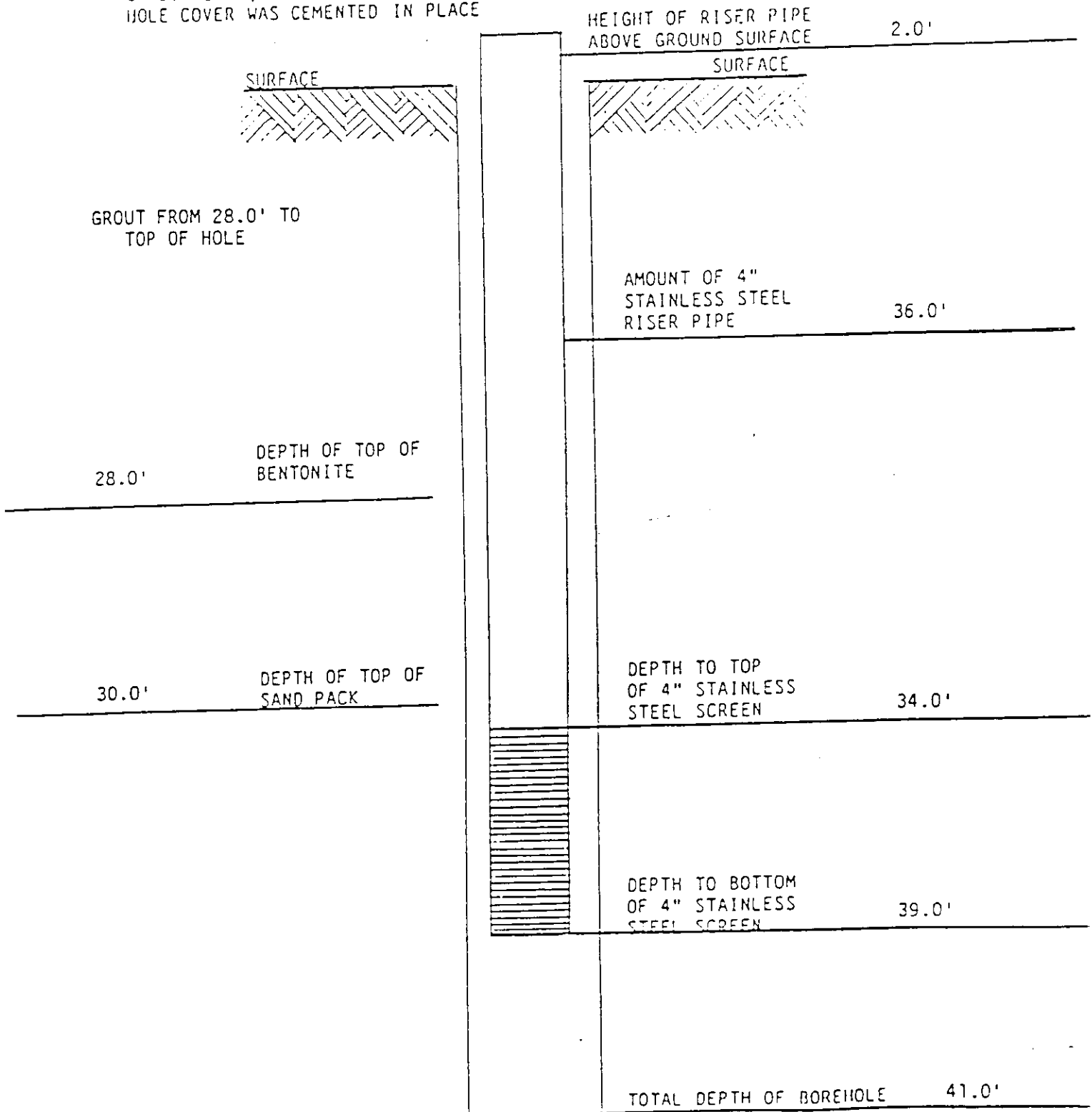
MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

May 223-AR

WELL NO. 223-A

DATE COMPLETED 11/10/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE



May 1986

TEST BORING RECORD

Sheet 1 of 2

for

Browning-Ferris Industries, Inc.

Location

CECOS Aber Road Facility

Standard

Williamsburg, Ohio

Started 11/1/85

Completed 11/8/85 Job No. 85147-1

Sampler Size 2 in O.D. Casing Size 8 in.

[illegible]

Field Number MP-223R
May 1986

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

Driller William J. Saccani

Water Level

1 hr. 24 hrs.

Casing Hammer Wt.		lbs.	Drop		in.
-------------------	--	------	------	--	-----

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Sampler Size 2 in O.D. Casing Size 8 in.

Note No. 223
For

Surface
Elevation

Sheet 2 of 2

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Completed

Job No. 85147-1

ELEVATION	DEPTH	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows 6" Penetration on Sampler
	50.0		(Contd)				
			Augered Overburden to Top of Rock				
	58.0						
	58.5		10.5' Gray Claystone, Dry		Core Rec.	58.8	50/.3'
			10.0' Gray Claystone with Hard Limestone Seams and Soft Clay Seams, Broken		86%	62.2	
	68.5				100%	68.5	

Field Number MP-223R
May 1986

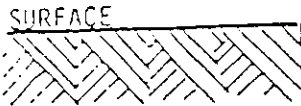
MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 223

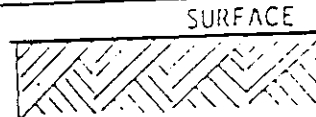
DATE COMPLETED 11/8/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE

HEIGHT OF RISER PIPE
ABOVE GROUND SURFACE 2.0'



GROUT FROM 51.0' TO
TOP OF HOLE



AMOUNT OF 4"
STAINLESS STEEL
RISER PIPE 58.0'

51.0' DEPTH OF TOP OF
BENTONITE

DEPTH TO TOP
OF 4" STAINLESS
STEEL SCREEN 56.0'

53.0' DEPTH OF TOP OF
SAND PACK

DEPTH TO BOTTOM
OF 4" STAINLESS
STEEL SCREEN 61.0'

TOTAL DEPTH OF BOREHOLE 68.5'



THE H. C. NUTTING COMPANY

GEOTECHNICAL AND TESTING ENGINEERS

SINCE 1921

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912 MORRIS STREET • CHARLESTON, WEST VIRGINIA 25301 • 304-344-0821
BOX NUMBER 11 • HIGHLAND HEIGHTS, KENTUCKY 41076 • 606-261-2043

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5-4-84 vf

P.O.#1615

TEST BORING REPORT

CLIENT CECOS International, Inc. ORDER No. 8454.025

PROJECT Installation of Monitoring Wells, Aber Road Facility, HOLE No. MP 224B
Clermont County, Ohio

LOCATION 5' south of MP 224

DRILLER H. Herd / Ins. E. Alder DRILL No. 36 DATE STARTED 4-30-84

ELEVATION REFERENCE Provided by client DATE COMPLETED 4-30-84

CASING: DIAMETER 6" Hollow Stem Auger HAMMER WT. FALL

SAMPLER: DIAMETER & TYPE 2" O. D. Split Spoon HAMMER WT. 300# FALL 30"

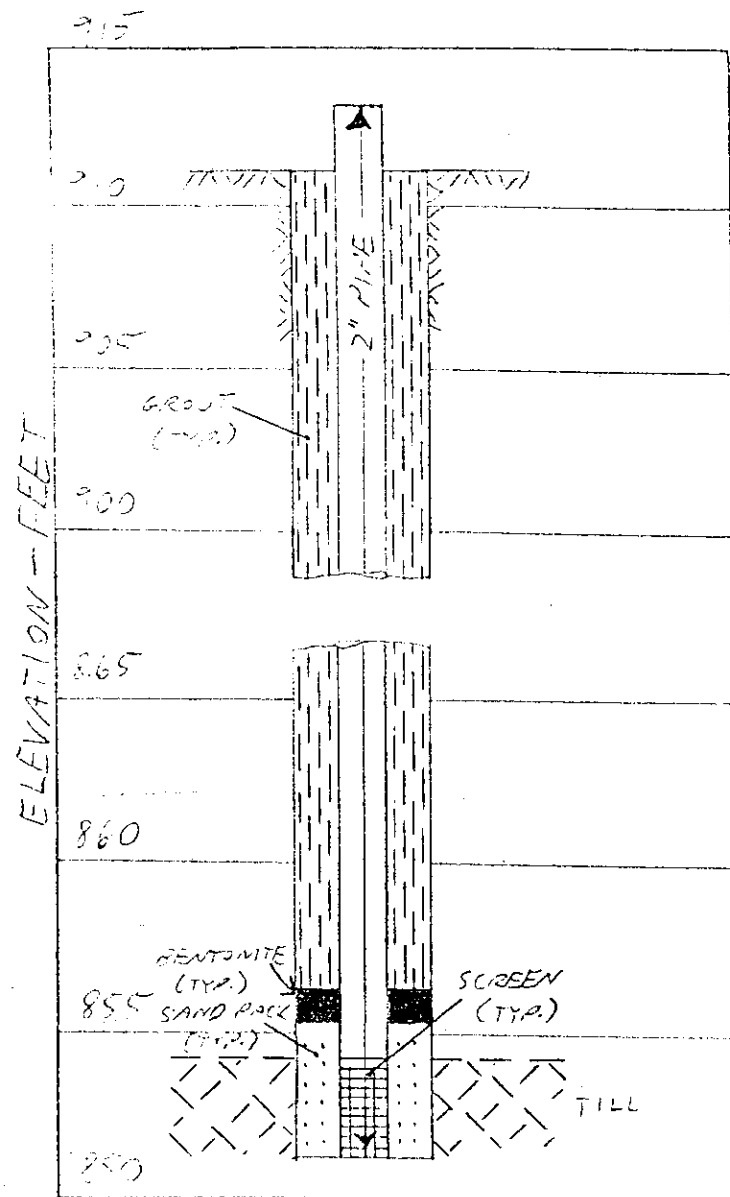
DEPTH TO WATER: IMMEDIATE UPON COMPLETION

DEPTH TO WATER DAYS AFTER COMPLETION WATER USED IN DRILLING

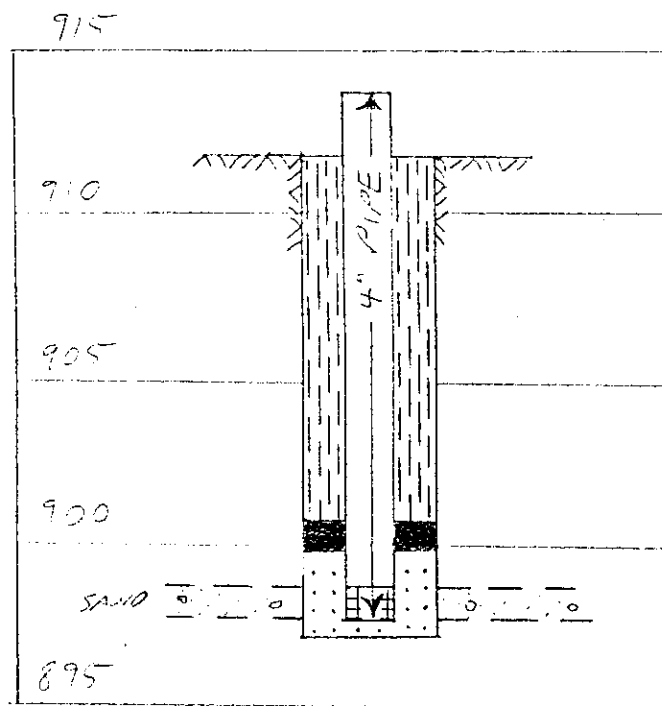
ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
911.7	0'						
		10.0' Augered to 10.0 and started sampling					
901.7	10.0'	1.5' Brown silty sandy clay, moist - stiff	1	10-11.5	SS	3-5-5	18"
900.2	11.5'	1.5' Brown sandy clay with gravel, rock fragments and a 1" sand seam at 12.0', moist - hard	2	11.5-13	SS	8-10-14	18"
898.7	13.0'	1.0' Brown silty fine sand, very moist - dense	3	13-14	SS	8-16	12"
897.7	14.0'	0.5' Brown sandy silty clay with gravel and rock fragments, moist - hard	4	14-14.5	SS	22	6"
897.2	14.5'	Set 1'(4") well screen 15.0'-13.0' Set 2' sand pack 14.0'-12.0' Set 1' Bentonite seal 12.0'-11'- Grouted 11.0' to surface 2' stick up Used 16'(4") PVC screen and pipe					

Respectfully submitted,

THE H. C. NUTTING CO.



MP224



MP224B



THE H. C. NUTTING COMPANY

GEOTECHNICAL AND TESTING ENGINEERS

SINCE 193

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BOX NUMBER 11 • HIGHLAND HEIGHTS, KENTUCKY 41076 • 806-261-2043

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TEST BORING REPORT

5-2-84 vF

P.O. #1615

Page 1 of 2

CLIENT CECOS International, Inc. ORDER No. 8454.025

PROJECT Installation of Monitoring Wells, Aber Road Facility, HOLE No. MP 226
Clermont County, Ohio

LOCATION As staked by client and as shown on plan

DRILLER J. Martin / Ins. B. Johnson DRILL No. 29 DATE STARTED 4-12-84

ELEVATION REFERENCE Provided by client DATE COMPLETED 4-14-84

CASING: DIAMETER 3.25" I. D. Hollow Stem Auger HAMMER WT. FALL

SAMPLER: DIAMETER & TYPE 2" O. D. Split Spoon HAMMER WT. 300# FALL 30"

DEPTH TO WATER: IMMEDIATE None UPON COMPLETION

DEPTH TO WATER DAYS AFTER COMPLETION WATER USED IN DRILLING

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER	RECD.
911.9	0'					37 1/2 Core Rec.	
	1.5'	Brown sandy clay, moist - soft	1	0-1.5	SS	1-2-8	18"
910.4	1.5'		2	1.5-3	SS	7-10-10	18"
	7.5'	Brown silty clay with fine to coarse sand with fine gravel and rock fragments	3	3-4.5	SS	5-6-11	18"
			4	4.5-6	SS	9-9-10	18"
			5	6-7.5	SS	5-5-5	18"
			6	7.5-9	SS	2-3-4	18"
902.9	9.0'		7	9-10.5	SS	2-4-5	18"
	3.0'	Mottled brown and gray sandy clay, moist - medium stiff	8	10.5-12	SS	3-5-11	18"
899.9	12.0'		9	12-13.5	SS	12-19-32	18"
	4.5'	Brown sandy silty clay with gravel and rock fragments, moist - stiff	10	13.5-15	SS	14-20-27	18"
			11	15-16.5	SS	13-16-18	18"
895.4	16.5'						

Respectfully submitted,

THE H. C. NUTTING CO.

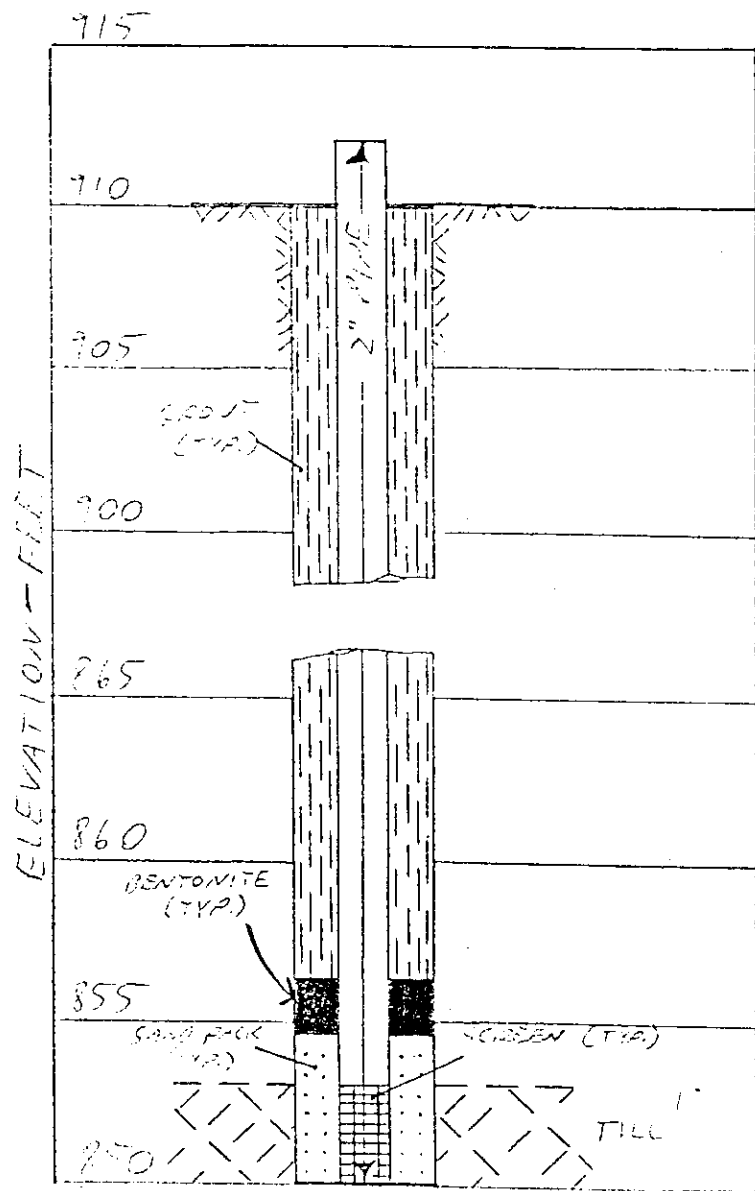
By M. F. J. [Signature]

Samples recovered from this test boring are available for inspection, which is strongly recommended. The company assumes no responsibility for interpretations made by others of load bearing, stability, excavating or other physical characteristics of materials penetrated in the boring.

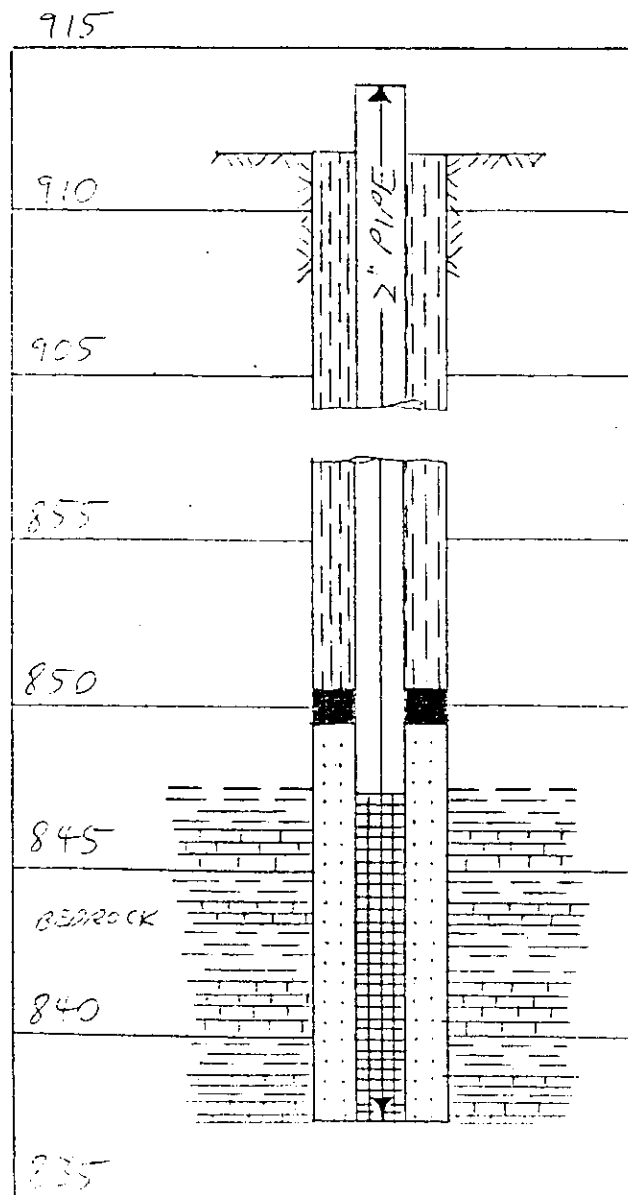
5-2-84 vf
Page 2 of 2

PROJECT Installation of Monitoring Wells, Aber Road Facility, HOLE No. MP 226
Clermont County, Ohio

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
895.4	16.5'						
	(1) 47.3'	Gray sandy silty clay with gravel and rock fragments, moist - stiff to hard	12	16.5-18	SS	11-13-16	18"
			13	18-19.5	SS	9-11-14	18"
			14	19.5-21	SS	9-11-14	18"
			15	21-22.5	SS	7-8-18	18"
			16	22.5-24	SS	9-11-12	18"
			17	24-25.5	SS	9-11-13	18"
			18	25.5-27	SS	7-8-14	18"
			19	27-28.5	SS	12-31-48	18"
			20	28.5-30	SS	25-58-73	18"
			21	30-31.5	SS	20-34-55	18"
			22	31.5-33	SS	22-35-48	18"
			23	33-34.5	SS	20-28-42	18"
			24	34.5-36	SS	18-30-50	18"
			25	36-37.5	SS	20-34-50	18"
			26	37.5-39	SS	24-39-65	18"
			27	39-40.5	SS	20-31-47	18"
			28	40.5-42	SS	20-32-49	18"
			29	42-43.5	SS	17-43-52	18"
			30	43.5-45	SS	15-21-35	18"
			31	45-46.5	SS	16-25-45	18"
			32	46.5-48	SS	17-22-33	18"
			33	48-49.5	SS	14-20-30	18"
			34	49.5-51	SS	14-20-31	18"
			35	51-52.5	SS	13-17-23	18"
			36	52.5-54	SS	11-13-19	18"
			37	54-55.5	SS	10-14-22	18"
			38	55.5-57	SS	10-15-28	18"
			39	57-58.5	SS	11-16-32	18"
			40	58.5-60	SS	8-12-18	18"
			41	60-61.5	SS	10-12-24	18"
			42	61.5-63	SS	12-18-39	18"
			43	63-63.8	SS	20	9"
848.1	63.8'	0.7' (4) Gray shale with limestone layers (augered)	44	63.8-64.5	SS	240 refusal	4"
847.4	64.5'	10.0' (4) Gray shale with limestone layers (cored)		64.5-74.5	NOM		
837.4	74.5'	BORING COMPLETED Set 10' (2") well screen 74.5'-64.5' Set 12' sand pack 74.5'-62.5' Set 1' Bentonite seal 62.5'-61.5' 2' stick up Used 76.5' (2") PVC screen and pipe					



MP225



MP226

Field Number MP-227AR
May 1986

TEST BORING RECORD

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

Driller Peter E. Martin

Water Level

1 hr. 24 hrs.

Casing Hammer Wt. lbs. Drop in.

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Sampler Size 2 in O.D. Casing Size 8 in.

Hole No. 227-A Surface Elevation Sheet 1 of 1

For Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Started 11/5/85 Completed 11/6/85 Job No. 85147-1

Completed 11/6/85

Job No. 85147-1

[illegible]

Field Number MP-227AR
May 1986

MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 227-A

DATE COMPLETED 11/6/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE

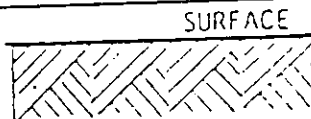
HEIGHT OF RISER PIPE
ABOVE GROUND SURFACE 2.0'



GROUT FROM 29.0' TO
TOP OF HOLE

29.0' DEPTH OF TOP OF
BENTONITE

31.0' DEPTH OF TOP OF
SAND PACK



AMOUNT OF 4"
STAINLESS STEEL
RISER PIPE 36.0'

DEPTH TO TOP
OF 4" STAINLESS
STEEL SCREEN 34.0'

DEPTH TO BOTTOM
OF 4" STAINLESS
STEEL SCREEN 39.0'

10" HOLE TO 40.0'

TOTAL DEPTH OF BOREHOLE 40.7'



Ground Water Associates, Inc.
CONSULTING HYDROGEOLOGISTS
6 1/2 N. STATE STREET
WESTERVILLE, OHIO 43081

PAGE 1 OF 2

321-081

BORE HOLE NO MP 227R

PROJECT CECOS International, Aber Road		LOCATION 15 feet from MP 227 well cluster	
DRILLING CONTRACTOR Moody's of Dayton		DRILLING EQUIPMENT Gus Pech Brat/22R	
GWA HYDROGEOLOGIST David P. Silbaugh		DRILLER Rob Hohl	
DATE START/TIME 11-18-86/0900 hrs.	DATE FINISH/TIME 12-8-86/1330 hrs.	SURFACE ELEVATION 910.6	TOTAL DEPTH 76.8 ft.
WELL CASING Schedule 40 PVC	SCREEN TYPE Schedule 40 PVC	LENGTH 5.0'	SLOT 0.010 in.

GROUND WATER				CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	WEATHER	TYPE	PVC	NX	spilt spoon
12-17-86	1142 hrs	29.07	40° F cloudy	DIAMETER	4 in ID	2 in ID	1-1/2" ID
12-18-86	1400 hrs	29.13	40° F rain	HAMMER WEIGHT			300 LBS
				FALL			30 in

REMARKS

DEPTH (FT.)	SAMPLE NO	BLOW COUNT PER 6 IN.	RECOVERY (IN.)	BORE HOLE LOG		GRAPHIC LOG
				LITHOLOGIC DESCRIPTION	REMARKS	
	1	2,5, 3,3	22	Gray silty CLAY, gravel up to 1/4", moist, plastic.	PID = 0 for all samples.	
	2	4,5, 4,6	13	Mottled gray and brown sandy CLAY, few sub rounded gravels up to 1/8" in bottom 3.0', moist, plastic.		
5	3	2,2, 3,4	20			
	4	3,4, 6,5	16			
	5	3,3, 10,18	24			
10	6	11,23, 37,57	24	Brown silty clay, TILL, sub rounded gravel up to 1/4", few rock fragments, moist, stiff.		
	7	12,27, 18,23	24	Gray silty clay TILL, sub rounded gravel up to 3/4", moist, stiff to hard.		
15	8	10,12, 18,19	18			
	9	10,16, 16,17	20			
	10	10,10, 14,20	24			
20	11	9,14, 12,12	20			
	12	10,8, 12,15	20			
25	13	9,10, 13,15	23			
	14	7,10, 15,15	12	28.0'-29.0' gray clay with few small gravels, wet, soft.		
	15	4,10, 14,15	15			



Ground Water Associates, Inc.

CONSULTING HYDROGEOLOGISTS

6 1/2 N. STATE STREET
WESTERVILLE, OHIO 43081

PAGE 2 OF 2

JOB NO 321-081

BORE HOLE NO
MP 227R

PROJECT CECOS International, Aber Road LOCATION 15 feet from MP227 well cluster

REMARKS

DEPTH (FT.)	SAMPLE NO	FLOW COUNT PER 6 IN.	RECOVERY (IN.)	LITHOLOGIC DESCRIPTION	REMARKS	GRAPHIC LOG
35	16	7, 9, 15, 16	20	Gray brown coarse grained SAND and sub rounded GRAVEL up to 1/4", wet, loose.		
	17	9, 12, 12, 12	22			
	18	5, 9, 14, 12	16			
	19	4, 7, 14, 12	18			
40	20	9, 18, 25, 43	24	Gray silty clay TILL, sub rounded gravel up to 1/2", hard, moist.		
	21	17, 23, 41, 55	14			
45	22	10, 19, 30	14			
50	23	36, 48, 78	18			
55	24	41, 31, 78	15		lined split spoon sample 53'-54.5' (permeability test)	
60	25	14, 38, 36	18			
	26	21, 36, 58	18			
65				Weathered interbedded blue green calcareous SHALE and light gray fossiliferous LIMESTONE, bed thick- nesses vary between 1/16"-6", lime- stone beds increase in number and thickness with depth.	Bedrock at 64.0' by augers 66.0-66.3' = bluegreen shale. NX rock core 66.8'- 76.8' (augered into bedrock to set casing) RQD = 9%	
70	27	102	4			

TEST BORING RECORD

Sampler Size 2 in O.D. Casing Size 8 in.

Location Williamsburg, Ohio
Started 11/15/85 Completed 11/17/85 Job No. 85147-1

[illegible]

May 1986

PITTSBURGH, PA. 15220

Driller Peter E. Martin

Water Level

1 hr.

24 hrs.

Casing Hammer Wt. lbs. Drop

Sampler Hammer Wt. 140 lbs. Drop 30

Sampler Size 2 in O.D. Casing Size 8

Hole No. 228

1002

Surface

Discussion

Sheet 1 of 2

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

11/7/85

Completed 11/15/85

Job No. 85147-1

[illegible]

May 1986

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

Water Level

1 hr.

Casing Hammer Wt.

Sampler Hammer Wt. 140 lbs. Drop 30

Sampler Size 2 in O.D. Casing Size 8

Hole No. _____
 for _____

228 Surface
Elevation

Sheet 2 of 2

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Location W
Started 11/7/85

Completed 11/15/85

Job No. 85147-1

[illegible]

Field Number MP228R
May 1986

MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 228

DATE COMPLETED 11/15/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE

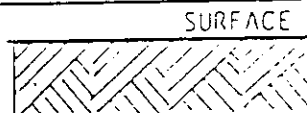
HEIGHT OF RISER PIPE
ABOVE GROUND SURFACE 2.0'



GROUT FROM 60.5' TO
TOP OF HOLE

60.5' DEPTH OF TOP OF
BENTONITE

62.5' DEPTH OF TOP OF
SAND PACK



AMOUNT OF 4"
STAINLESS STEEL
RISER PIPE 67.5'

DEPTH TO TOP
OF 4" STAINLESS
STEEL SCREEN 65.5'

DEPTH TO BOTTOM
OF 4" STAINLESS
STEEL SCREEN 70.5'

BOTTOM OF 8" HOLE - 73.0'

TOTAL DEPTH OF BOREHOLE 78.2'



THE H. C. NUTTING COMPANY

GEOTECHNICAL AND TESTING ENGINEERS

SINCE 1921

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5-2-84 vf

P.O.#1615

TEST BORING REPORT

CLIENT CECOS International, Inc. ORDER No. 8454.025

PROJECT Installation of Monitoring Wells, Aber Road Facility, HOLE No. MP-229 B

LOCATION 5' east of MP229

DRILLER H. Herd / Ins. E. Alder DRILL No. 37 DATE STARTED 4-23-84

ELEVATION REFERENCE Provided by client DATE COMPLETED 4-24-84

CASING: DIAMETER 6" I. D. Hollow Stem Auger HAMMER WT. FALL

SAMPLER: DIAMETER & TYPE 2" O. D. Split Spoon HAMMER WT. 300# FALL 30"

DEPTH TO WATER: IMMEDIATE UPON COMPLETION

DEPTH TO WATER DAYS AFTER COMPLETION WATER USED IN DRILLING

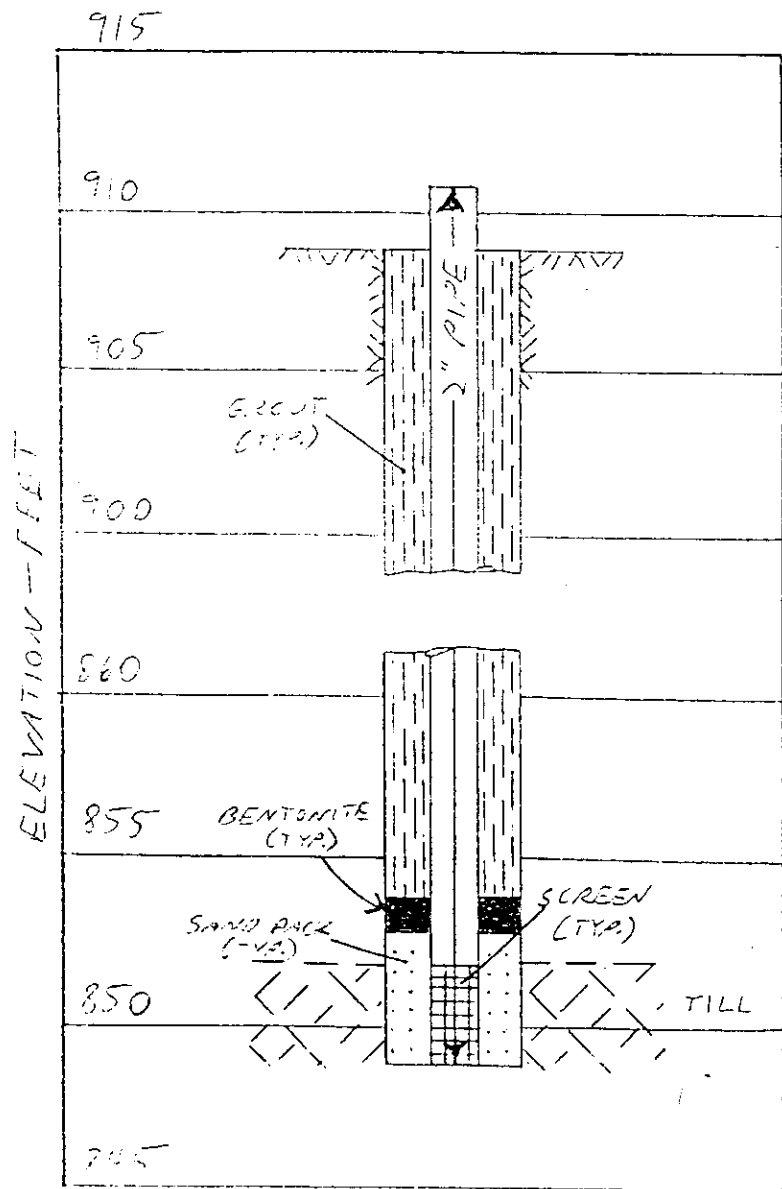
ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
908.9	0'						
		25.5' Augered to 25.5 and started sampling					
883.4	25.5'	5.0' Gray silty sandy clay with gravel and rock fragments, moist - very stiff to hard	1	25.5-27	SS	7-12-13	18"
			2	27-28.5	SS	6-8-13	18"
			3	28.5-30	SS	6-8-9	18"
			4	30-30.5	SS	10	6"
878.5	30.5'	2.5' Brown silty fine to coarse sand and gravel, wet - very dense	5	30.5-31.5	SS	19-26	12"
			6	31.5-33	SS	9-11-13	16"
875.9	33.0'	2.5' Gray silty fine to coarse sand and gravel, wet - very dense	7	33-34.5	SS	15-18-25	15"
			8	34.5-35.5	SS	10-21	6"
873.4	35.5'	0.5' Gray silty sandy clay with gravel and rock fragments, moist - hard	9	35.5-36	SS	34	6"
872.9	36.0'	Set 5' (4") well screen 35.5'-30.5'					
		Set 6' sand pack 35.5'-29.5'					
		Set 1' Bentonite seal 29.5'-28.5'					
		Grouted 28.5' - surface					
		2' stick up					
		Used 37.5' (4") PVC screen and pipe					

Samples recovered from this test boring are available for inspection, which is strongly recommended. The company assumes no responsibility for interpretations made by others of load bearing, stability, excavating or other physical

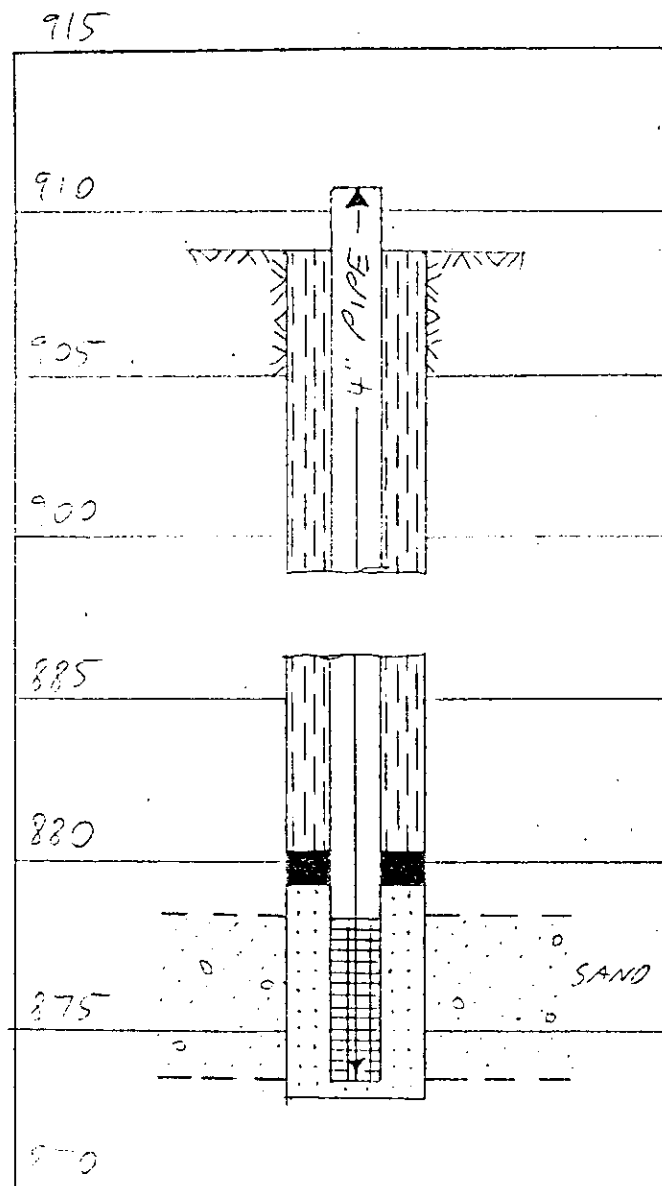
Respectfully submitted,

THE H. C. NUTTING CO.

M. E. Nutting



MP229



MP229B



THE H. C. NUTTING COMPANY

GEOTECHNICAL AND TESTING ENGINEERS

SINCE 1921

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912 MORRIS STREET • CHARLESTON, WEST VIRGINIA 25301 • 304-344-0821
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5-1-84 vf
P.O. #1615

TEST BORING REPORT

CLIENT CECOS International, Inc. ORDER No. 8454.025

PROJECT Installation of Monitoring Wells, Aber Road Facility, HOLE No. 230A
Clermont County, Ohio

LOCATION 5' west of MP 230

DRILLER W. Martin / Ins. B. Johnson DRILL No. 36 DATE STARTED 4-24-84

ELEVATION REFERENCE Provided by client DATE COMPLETED 4-24-84

CASING: DIAMETER 6" Hollow Stem Auger HAMMER WT. FALL

SAMPLER: DIAMETER & TYPE 2" O. D. Split Spoon HAMMER WT. 300# FALL 30"

DEPTH TO WATER: IMMEDIATE 26.5' UPON COMPLETION

DEPTH TO WATER DAYS AFTER COMPLETION WATER USED IN DRILLING

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
906.8	0'						
		22.0' Auger 22.0' - no samples					
884.8	22.0'	4.5' Gray sandy silty clay with gravel and rock fragments, moist - stiff	1 2 3	22-23.5 23.5-25 25-26.5	SS SS SS	5-8-13 6-8-15 9-12-38	18" 18" 18"
880.3	26.5'	1.5' Brown fine coarse sand and gravel, wet - dense	4	26.5-28	SS	3-7-13	18"
878.8	28.0'	1.0' Gray sandy silty clay with gravel and rock fragments, moist - stiff	5	28-29	SS	13-77	12"
877.8	29.0'	BORING COMPLETED Set 1.5' (4") well screen 28.0'-26.5' Set 2.5' sand pack 28.0'-25.5' Set 1' Bentonite seal 25.5'-24.5' Grouted 24.5' to surface 2' stick up Used 30' (4") PVC screen and pipe					

Respectfully submitted,

THE H. C. NUTTING CO.

Samples recovered from this test boring are available for inspection, which is strongly recommended. The company assumes no responsibility for interpretations made by others of load bearing, stability, excavating or other physical

Field Number MP-230X^R
May 1986

TEST BORING RECORD

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

Driller James McCann

Water Level

1 hr. 24 hrs.

Casing Hammer Wt. lbs. Drop 30 in.

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Sampler Size 2 in O.D. Casing Size 8 in.

Hole No.
For

230-X^R Surface Elevation

Sheet 1 of 2

Browning-Ferris Industries, Inc.
CECOS Aber Road Facility
Williamsburg, Ohio

Location

Started 10/28/85

Completed 10/29/85

Job No. 85147-1

ELEVATION	DEPTH	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blow/6" Penetration on Sampler
	0.0						
	11.0		11.0' Brown Silty Clay, Stiff, Damp				
	30.0		19.0' Very Stiff Gray Silty Clay, Damp - Till				
	36.0		6.0' Fine Gray Silt with Sand, Wet				
	50.0		34.0' Very Stiff Gray Silty Clay with Small Gravel, Damp				
			(Continued)				

May 1986 ^{7d}
TEST BORING RECORD

May 1986 ^{7d}
TEST BORING RECORD

Hole No. 230-~~XR~~ Surface Elevation Sheet 2
For ~~1st~~ Browning-Ferris Industries, Inc.
CECOS Aber Road Facility
Location Williamsburg, Ohio
Completed Job No. 8

Job No. 85147-1

ELEVATION	DEPTH 50.0	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/6" Penetration on Sampler
			(Contd)				
			Very Stiff Gray Silty Clay with Small Gravel, Damp				
	70.0		3.0' Gray Fine Silt with Sand				
	73.0		2.0' Weathered Gray Clayey Shale				
	75.0				Core Rec.	75.0	
					87%	76.5	
					100%	79.5	
					90%	83.5	
					82%	88.0	
	88.0		Reamed NX Hole to 6"				

Field Number MP230XR
May 1986
TSR

MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 230XR
TSR

DATE COMPLETED 10/29/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE

HEIGHT OF RISER PIPE
ABOVE GROUND SURFACE 2.0'



GROUT FROM 74.5' TO
TOP OF HOLE

OTTAWA SAND FROM 75.5'
TO 74.5'

75.5' DEPTH OF TOP OF
BENTONITE

77.5' DEPTH OF TOP OF
SAND PACK

SURFACE

AMOUNT OF 4"
STAINLESS STEEL
RISER PIPE 81.5'

DEPTH TO TOP
OF 4" STAINLESS
STEEL SCREEN 79.5'

DEPTH TO BOTTOM
OF 4" STAINLESS
STEEL SCREEN 84.5'

TOTAL DEPTH OF BOREHOLE 88.0'

231AR

TEST BORING RECORD

Hole No.	231-A	Surface Elevation	Sheet	1	of	1
For	Browning-Ferris Industries, Inc. CECOS Aber Road Facility					
Location	Williamsburg, Ohio					
Started	11/17/85	Completed	11/17/85	Job No.	85147-1	

1 hr.	24 hrs.		
Casing Hammer Wt.	lbs. Drop		in.
Sampler Hammer Wt.	140 lbs. Drop	30	in.
Sampler Size	2 in O.D. Casing Size	8	in.

Location Williamsburg, Ohio
Started 11/17/85 Completed 11/17/85 Job No. 85147-1

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May 1986

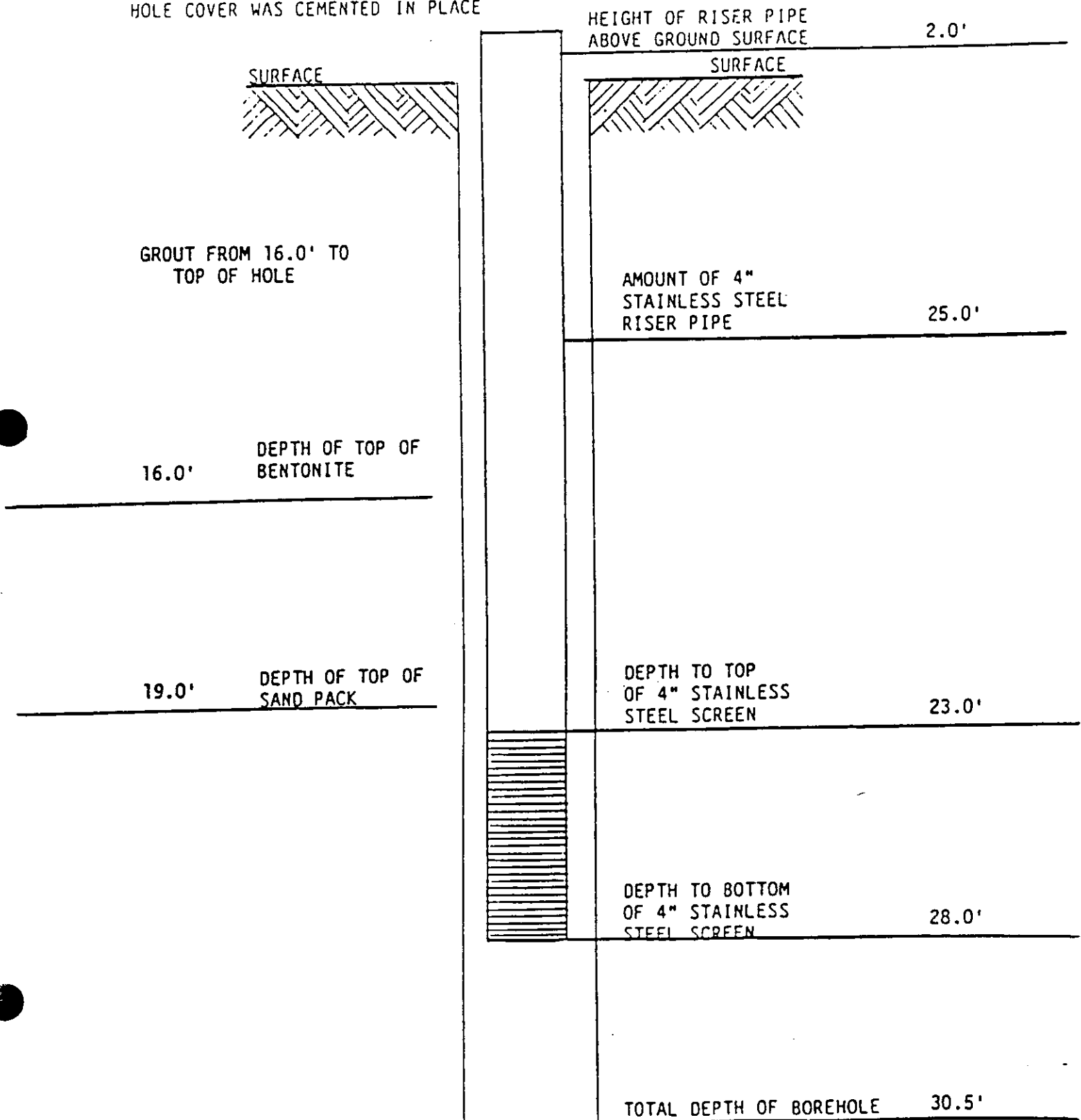
MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

231AR

WELL NO. 231-A

DATE COMPLETED 11/17/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE



Field Number MP-231BR

May 1986

TEST BORING RECORD

PENNSYLVANIA DRILLING COMPANY

PITTSBURGH, PA. 15220

Driller James McCann

Water Level

1 hr.

24 hrs.

Casing Hammer Wt. lbs. Drop

Sampler Hammer Wt. 140 lbs. Drop 30

Sampler Size 2 in O.D. Casing Size 8

Hole No. 231-B

For

Surface
Elevation

Sheet 1 of 2

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Location
Started 11/16/85

Completed 11/17/85

Job No. 85147-1

ELEVATION	DEPTH	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/6" Penetration on Sampler
	0.0						
	5.0		5.0' Limestone with Brown Clay - Fill				
	17.0		12.0' Stiff Brown Silty Clay, Damp				
	25.0		8.0' Stiff Gray Silty Clay with Limestone, Damp - Till				
	29.0		4.0' Gray Sandy Silt with Gravel, Wet				
			26.0' Very Stiff Gray Silty Clay with Limestone				
	50.0						

TEST BORING RECORD

PITTSBURGH, PA. 15220

Sheet 2 of 2

Browning-Ferris Industries, Inc.
CECOS Aber Road Facility
Williamsburg, Ohio

Job No. 85147-1

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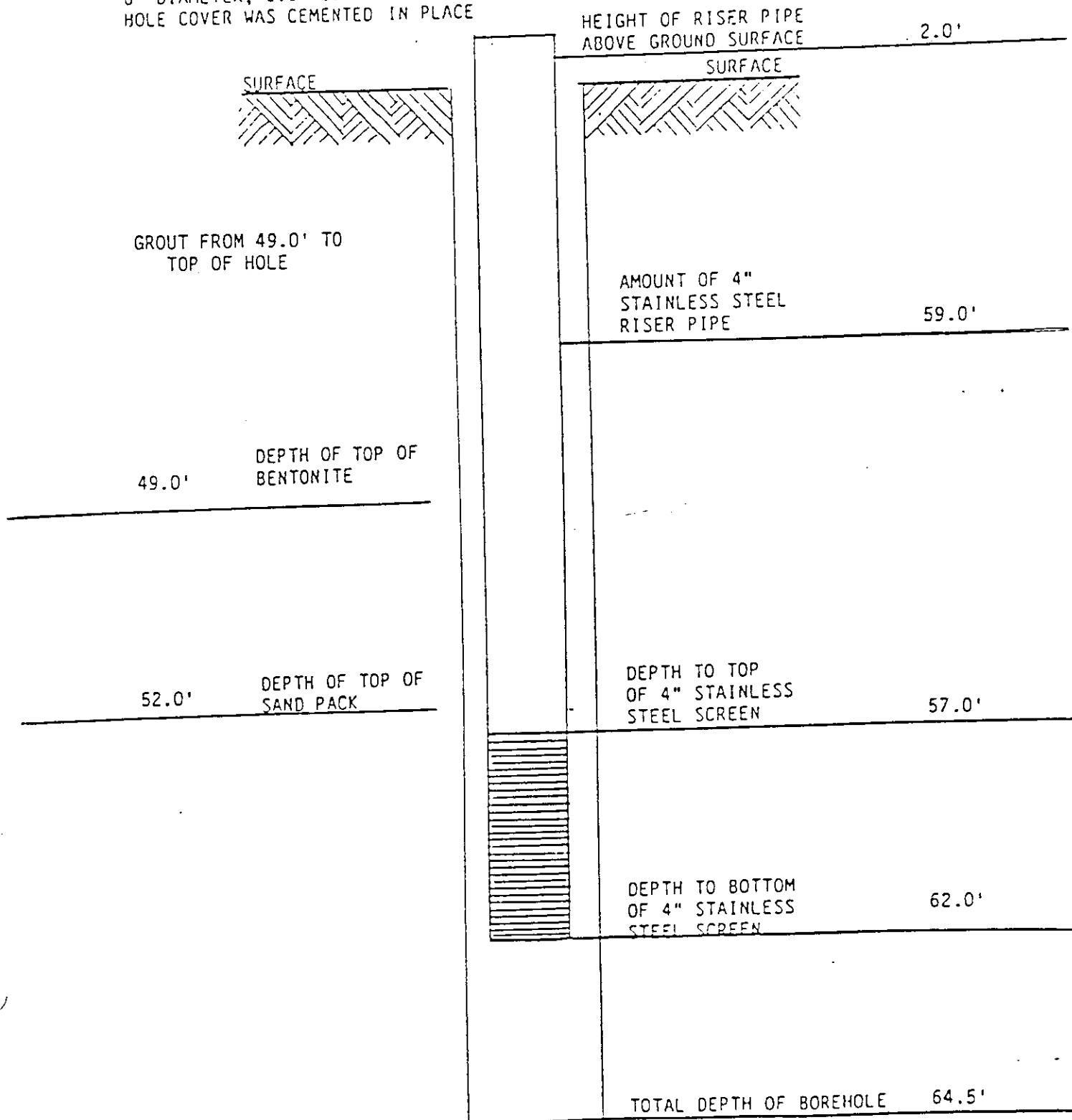
Field Number MP-231BR
May 1986

MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 231-B

DATE COMPLETED 11/17/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE



Field Number MP-231R
May 1986

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

TEST BORING RECORD

Driller James McCann Hole No. 231 Surface Elevation Sheet 1 of 3
Water Level For Browning-Ferris Industries, Inc.
1 hr. 24 hrs. CECOS Aber Road Facility
Casing Hammer Wt. lbs. Drop 30 in. Location Williamsburg, Ohio
Sampler Hammer Wt. 140 lbs. Drop 30 in. Started 11/14/85 Completed 11/16/85 Job No. 85147-1
Sampler Size 2 in O.D. Casing Size 8 in.

ELEVATION	DEPTH	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows 6" Penetration on Sampler
	0.0						
	5.0		5.0' Loose Limestone Boulder with Brown Clay - Fill				
	17.0		12.0' Stiff Brown Silty Clay, Damp				
	25.0		8.0' Very Stiff Gray Silty Clay with Limestone, Damp				
	30.0		5.0' Gray Silty Clay with Some Sand, Small Gravel, Wet				
			35.0' Very Stiff Gray Silty Clay with Small Gravel with Some Limestone, Damp				
	50.0						

(Continued)

Field Number MP-231R
May 1986

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

TEST BORING RECORD

Driller James McCann

Hole No. 231
for

Surface
Elevation

Sheet 2 of 3

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Job No. 85147-1

1 hr.	24 hrs.		
Casing Hammer Wt.	lbs. Drop		in.
Sampler Hammer Wt.	140 lbs. Drop	30	in.
Sampler Size	2 in O.D. Casing Size	8	in.

Location
Started

Completed

ELEVATION	DEPTH	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows 6" Penetration on Sampler
	50.0		(Contd)				
			Very Stiff Gray Silty Clay with Small Gravel with Some Limestone, Damp				
	65.0						
			20.0' Very Stiff Gray Silty Clay with Limestone Boulder			66.5	29-57-88
						71.5	25-47-52
						76.5	10-40-60
						81.0	50-100
	85.0					85.0	110-1.5'
			30.0' Very, Very Stiff Gray Silty Clay		Core Rec.		
					85%	91.0	
					50%	99.0	
	100.0		(Continued)				

May 1986

TEST BORING RECORD

Driller James McCann

Water Level

1 hr.	24 hrs.
100	100
90	90
80	80
70	70
60	60
50	50
40	40
30	30
20	20
10	10
0	0

Casing Hammer Wt.	340	lbs.	Drop	30	in.
-------------------	-----	------	------	----	-----

Sampler Hammer Wt. 140. lbs. Drop 30 in.

Sampler Size 2 in O.D. Casing Size 8 in.

for

Surface
Elevation

Sheet 3 of 3

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Completed

Job No. 85147-1

[illegible]

Field Number MP-231R
May 1986

MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 231

DATE COMPLETED 11/16/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE

HEIGHT OF RISER PIPE
ABOVE GROUND SURFACE 2.0'

SURFACE

SURFACE

GROUT FROM 105.0' TO
TOP OF HOLE

AMOUNT OF 4"
STAINLESS STEEL
RISER PIPE 114.0'

105.0' DEPTH OF TOP OF
BENTONITE

DEPTH TO TOP
OF 4" STAINLESS
STEEL SCREEN 112.0'

108.0' DEPTH OF TOP OF
SAND PACK

DEPTH TO BOTTOM
OF 4" STAINLESS
STEEL SCREEN 117.0'

TOTAL DEPTH OF BOREHOLE 125.0'



THE H. C. NUTTING COMPANY

GEOTECHNICAL AND TESTING ENGINEERS

SINCE 1921

4120 AIRPORT ROAD • P.O. BOX C • CINCINNATI, OHIO 45226 • 513-321-5816
912 MORRIS STREET • CHARLESTON, WEST VIRGINIA 25301 • 304-344-0821
BOX NUMBER 11 • HIGHLAND HEIGHTS, KENTUCKY 41076 • 806-261-2043

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5-15-84 mp
P.O.#1615

TEST BORING REPORT

CLIENT CECOS International, Inc. ORDER No. 8454.025

PROJECT Installation of Monitoring Wells, Aber Road Facility, HOLE No. MP 232A
Clermont County, Ohio

LOCATION 5' South of MP 232

DRILLER H. Hard / Ins. E. Alder DRILL No. 86 DATE STARTED 5-2-84

ELEVATION REFERENCE Provided by client DATE COMPLETED _____

CASING: DIAMETER 6" I.D. Hollow Stem Auger HAMMER WT. _____ FALL _____

SAMPLER: DIAMETER & TYPE 2" O.D. Split Spoon HAMMER WT. 300# FALL 30"

DEPTH TO WATER: IMMEDIATE _____ UPON COMPLETION _____

DEPTH TO WATER _____ DAYS AFTER COMPLETION _____ WATER USED IN DRILLING _____

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
905.9	0.0'						
		22.0' Augered to 22.0' and started sampling					
883.9	22.0'		1	22-23.5	SS	11-14-25	18"
		4.5' Gray silty sandy clay with gravel and rock fragments, moist - hard	2	23.5-25	SS	12-15-21	18"
			3	25-26.5	SS	8-16-26	18"
879.4	26.5'		4	26.5-28	SS	12-14-19	17"
		3.0' Brown fine to coarse sand, wet - dense	5	28-29.5	SS	9-17-23	15"
876.4	29.5'		6	29.5-31	SS	9-12-15	15"
		4.5' Brown silty fine to coarse sand and gravel, wet - dense	7	31-32.5	SS	11-17-18	16"
			8	32.5-34	SS	9-12-22	16"
871.9	34.0'		9	34-35.5	SS	15-37-50	18"
		1.5' Gray silty sandy clay with gravel and rock fragments, moist - hard					
870.4	35.5'	Set 5' (4") well screen 34.0'-29.0'					
		Set 8.5' gravel pack 34.0'-25.5'					
		Set 1' Bentonite seal 34.0'-33.0'					
		2' stick up					
		Used 36' (4") PVC screen and pipe					

Respectfully submitted,

THE H. C. NUTTING CO.

Field Number MP-233AR
May 1986

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

TEST BORING RECORD

Driller Peter E. Martin

Water Level

1 hr. 24 hrs.

Casing Hammer Wt.		lbs.	Drop
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Sampler Hammer Wt. 140 lbs. Drop 30

Sampler Size 2 in O.D. Casing Size 8 in.

Hole No.	233-A	Surface Elevation	Sheet	1	of	1
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For Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Location Williamsburg, Ohio

Started 11/17/85 Completed 11/18/85 Job No. 85147-1

— *Journal of the American Medical Association*, 1997

[illegible][illegible]

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

Page 1 of 8

JOB NO: 321-136

BOREHOLE: MP-233R

PURPOSE: Comprehensive Monitoring Program

LOCATION: N: 5119.89 E: 6891.39

DRILL CONTRACTOR: Penn Drill

RIG TYPE: Acker AD-2 HSA

GWA GEOLOGIST: D. Lawton

DRILLER: Bernie Gollihue

DATE START: 3 /14/89

DATE FINISH: 3 /18/89

GRADE ELEVATION: 905.5 TOTAL DEPTH: 81.5

CASING TYPE: 316 Stainless Steel

SCREEN TYPE: 316 Stainless Steel

SCREENED INTERVAL: 70.5-75.5

GROUND WATER DATA

DATE	TIME	DEPTH	REMARKS	TYPE	CASING	CORE	SAMPLER	TUBE
04/27/89	1640	23.82		DIAMETER		NX	spl sp	
/ /				HAMMER			3001b.	
/ /				FALL			30in.	

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
1	S-1	3 2 2 3	18	CLAY (fill?): mottled brown - tan/gray: firm: moist.		
2		3 3				
3	S-2	4 4	21			
4		1 1		No recovery in first split spoon, so drove a second spoon.		
5	S-3	1 1	8	Some slag .		
6		1 1				
7	S-4	3 2	23			

REMARKS: Located at SE corner of SCMF No. 7 TOC Elevation (measuring reference point)
907.16 ft. (5/8/89)

LOG NO: 321-136

BOREHOLE: MP-233R

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 5119.89 E: 6891.39

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
8		8				
		14				
9	S-5	18	24	Till: gray: mostly silty clay, few gravel, trace rock fragments: hard: dry to moist.		
		19				
10		4				
		6				
11	S-6	8	8	10.8-10.85 SANDY LENS: brown: fine-medium grained: loose: dry.		
		9				
12		10				
		12				
13	S-7	18	24			
		21				
14		11				
		15				
15	S-8	20	24			
		24				
16		18				
		21				
17	S-9	72	24			
		200				
18		15				
		25				
19	S-10	32	19			
		53				

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

Page 3 of 8

JOB NO: 321-136

BOREHOLE: MP-233R

PURPOSE: Comprehensive Monitoring Program

LOCATION: N: 5119.89 E: 6891.39

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
20		28		TILL: continued.		
		53				
21	S-11	80	24			
		69		21.2 SAND: med-fine grained with some gravel: loose: moist-wet.		
22		81				
		75				
23	S-12	59	24	22.9 CLAY: gray: firm: moist.		
		51		23.3 SAND: as above.		
24				23.7 CLAY: gray: silty: soft-firm: moist.		
		18		24.1 SAND: fine-medium grained: brown: fining downward.		
25	S-13	26	24			
		43				
26		39		25.8 Silty Fine SAND: clay at base.		
		54		26.2 SAND: fine-med. grained: brown: loose: wet: little clay.		
27	S-14	162	20			
		200/2		27.6		
28		32		TILL: gray: mostly silty clay, few gravel. trace pebbles: hard: dry to moist.		
		49				
29	S-15	57	24			
		97				
30		15				
		18				
31	S-16	21	24	30.5-30.6: SAND AND GRAVEL: moist.		
		21				

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

Page 4 of 8

WELL NO: 321-136

BOREHOLE: MP-233R

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 5119.89 E: 6891.39

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
32		8		TILL: continued.		
		14				
33	S-17	17	24			
		21				
34		9				
		12				
35	S-18	13	22			
		15				
36		8				
		10				
	S-19	11	24			
		15				
38		7				
		10				
39	S-20	14	24			
		14				
40		6				
		9				
41	S-21	11	24			
		15				
42		6				
		13				
43	S-22	15	24			
		23				

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

Page 5 of 8

JOHN NO: 321-136

BOREHOLE: MP-233R

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 5119.89 E: 6891.39

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
44		8		TILL: continued.		
		16				
45	S-23	21	24			
		28				
46		10				
		16				
47	S-24	20	24			
		30				
48		9				
		16				
	S-25	18	24			
		21				
50		8				
		13				
51	S-26	39	24			
		51				
52		13				
		23				
53	S-27	21	24			
		32				
54		11				
		12				
55	S-28	16	24			
		26				
56						

REMARKS:

JOB NO: 321-136

BOREHOLE: MP-233R

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 5119.89 E: 6891.39

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
56		12		TILL: continued.		
		19				
57	S-29	19	24			
		21				
58		13				
		18				
59	S-30	60	24			
		22				
60		12		SILTY SAND: gray/brn: fine grained: loose: moist.	60.0	
		8		TILL: as above, less silt.	60.4	
61	S-31	12	24			
		15				
62		8				
		11				
63	S-32	11	24			
		15				
64		9				
		9				
65	S-33	15	24			
		20				
66		10				
		13				
67	S-34	16	24			
		23				
				SILTY SAND: fine grained: with some clay: wet.	66.8	
					67.1	

Split spoon
sample wet @
top. Sand at
60 ft. may be
making a little
water.

REMARKS:

JOB NO: 321-136

BOREHOLE: MP-233R

PURPOSE: Comprehensive Monitoring Plan

LOCATION: N: 5119.89 E: 6891.39

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
68		8		TILL: continued.		
		11				
69	S-35	12	24			
		20				
70		6				
		9				
71	S-36	14	24			
		15				
72				71.9		
		17		CLAY: green/gray with blue/gray shale fragments: hard: moist. Rock fragment @ 72.3'		
		14				
73	S-37	20	24			
		47				
				73.6		
74		12		SHALE: weathered, gray, with some green/gray clay: several thin limestone beds, grading downward to shale.		
		36				
75	S-38	51	18			
		56/2				
76				CORE RUN #1 SHALE: med-light gray: hard. Distinct laminar bedding: occasional thin fossiliferous limestone beds. Numerous core breaks along bedding planes. Vertical fractures @ 80.1 - 80.3 81.4 - 81.6 82.1 - 82.2	Core interval= 76-81.5ft. REC = 100% ROD = 10%	
77						
78						
79						
80						

REMARKS:

BOREHOLE: MP-233R

LOCATION: N: 5119.89 E: 6891.39

REMARKS:

Field Number MP-234R
May 1986

PENNSYLVANIA DRILLING COMPANY

TEST BORING RECORD

PITTSBURGH, PA. 15220

Driller James McCann

Hole No. 234
For

Surface
Elevation

Sheet 1 of 2

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Location
Started 10/31/85

Completed 11/1/85

Job No. 85147-1

Water Level
1 ft.
24 hrs.
Casing Hammer Wt. lbs. Drop in.
Sampler Hammer Wt. 140 lbs. Drop 30 in.
Sampler Size 2 in O.D. Casing Size 8 in.

ELEVATION	DEPTH	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows 5/6" Penetration on Sampler
	0.0						
	5.0		5.0' Gray Silty Clay with Limestone, Damp				
	13.0		8.0' Brown Silty Clay, Stiff, Damp				
	25.0		12.0' Very Stiff Gray Silty Clay with Small Gravel, Damp - Till				
	31.0		6.0' Soft Gray Fine Silt with Layer of Fine Sand, Wet				
			27.0' Very Stiff Gray Silty Clay with Limestone & Gravel - Till				
	50.0						

(Continued)

Field Number Mr-234R
May 1986

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

TEST BORING RECORD

Driller James McCann

Bale No. 234

Surface
Elevation

Sheet 2 of 2

Water Level:

103

Browning-Ferris Industries, Inc.

1 hr.	24 hrs.
100	100
90	90
80	80
70	70
60	60
50	50
40	40
30	30
20	20
10	10
0	0

Location

CECOS Aber Road Facility

Casing Hammer Wt.	Ibs	Drop	ft.
100	100	100	100

Starred

Williamsburg, Ohio

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Completed

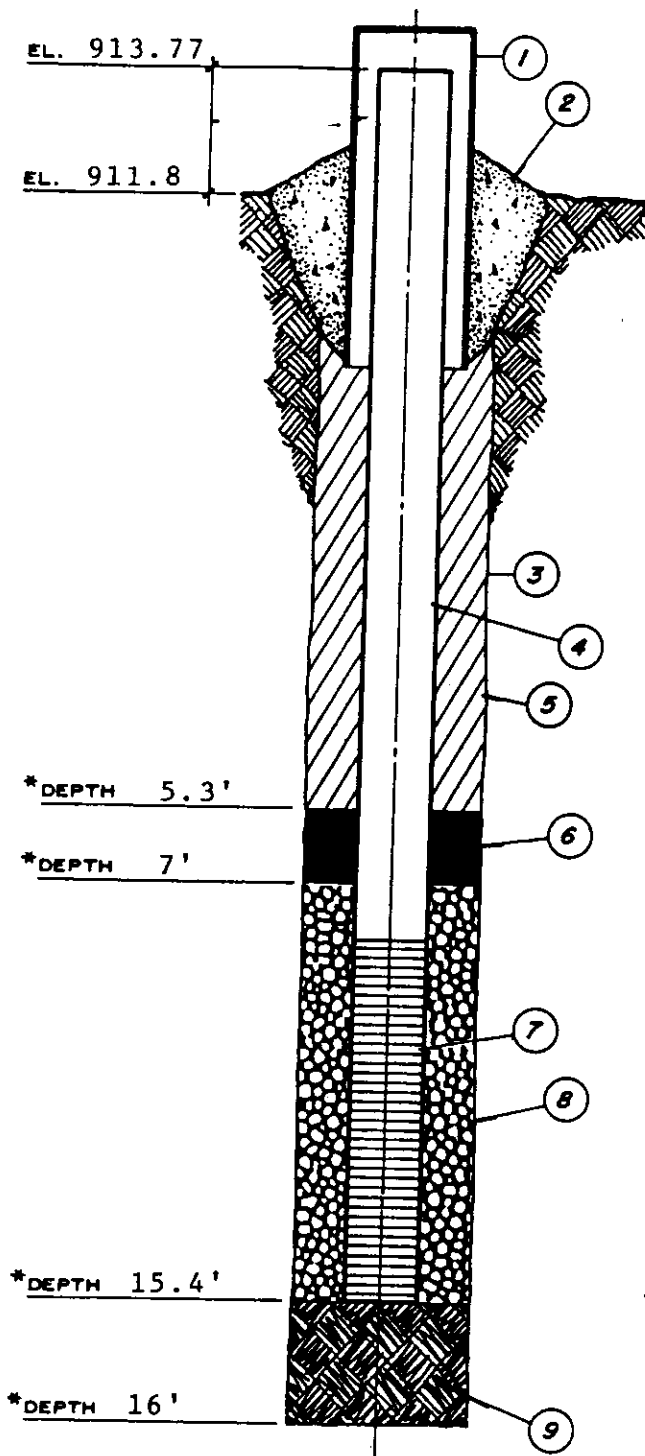
Job No. 25147-1

Sampler Size 2 in O.D. Casing Size 8 in.

ELEVATION	DEPTH	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blow 4/6" Penetration on Sampler
	50.0		(Contd)				
	58.0		Very Stiff Gray Silty Clay with Limestone & Gravel - Till				
	62.0		4.0' Gray Weathered Clay Shale				
			Pressure Test - 62.0' to 70.0'				
			12.0' Medium Hard Gray Silty Shale with Hard Gray Limestone Seams				
			Reamed to 8" from 62.0' to 70.0'		Core Rec.		
			Reamed to 6" from 70.0' to 74.0'		83%		
	74.0						

MONITOR WELL COMPLETION REPORT :

WELL N^o MP235ARJOB N^o 321-081
 PROJECT CECOS International-Aber Road
installed 12/10/86



*all depths measured from ground surface.

1. PROTECTIVE CASING I.D. 8 INCHES.
2. SURFACE SEAL TYPE 5% bentonite grout
3. BOREHOLE DIAMETER 10 INCHES.
4. RISER PIPE:
 - a. Type 304 stainless-steel
 - b. I.D. 4 INCHES
 - c. Length 13 FEET
 - d. Joint Type flush thread coupled
5. BACKFILL:
 - a. Type 5% bentonite grout
 - b. Installation side discharge tremie
6. Type of SEAL 3/8-in. bentonite pellets
7. SCREEN
 - a. Type 304 stainless-steel
 - b. I.D. 4 INCHES
 - c. Slot Size 0.010 INCHES
 - d. Length 5 FEET
8. SCREEN FILTER TYPE #5 silica sand
9. BACKFILL TYPE native fill

TEST BORING RECORD

Sampler Size: 2 in O.D. Casing Size: 8

Location Williamsburg, Ohio
Started 11/18/85 Completed 11/19/85 Job No. 85147-1

Job No. 85147-1

[illegible]

TEST BORING RECORD

Completed 11/19/85 Job No. 85147-1

[illegible]

MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

2356R

WELL NO. 235-C

DATE COMPLETED 11/19/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE

GROUT FROM 17.0' TO
TOP OF HOLE

17.0'

DEPTH OF TOP OF
BENTONITE

19.0'

DEPTH OF TOP OF
SAND PACK

BOTTOM OF 8" HOLE - 27.0'

HEIGHT OF RISER PIPE
ABOVE GROUND SURFACE

2.0'

SURFACE

AMOUNT OF 4"
STAINLESS STEEL
RISER PIPE

23.0'

DEPTH TO TOP
OF 4" STAINLESS
STEEL SCREEN

21.0'

DEPTH TO BOTTOM
OF 4" STAINLESS
STEEL SCREEN

26.0'

TOTAL DEPTH OF BOREHOLE

27.0'

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 W. State Street
Westerville, Ohio 43081

Page 1 of 2

WQP NO: 321-136

BOREHOLE: MP-235R

OBJECT: Comprehensive Monitoring Program		LOCATION: N: 5235.16 E: 6353.61	
DRILL CONTRACTOR: Penn Drill		RIG TYPE: Mobile B-53 ATV	
GWA GEOLOGIST: Norm Gardner		DRILLER: Jim Saccani	
DATE START: 3 /20/89	DATE FINISH: 3 /28/89	GRADE ELEVATION: 911.8	TOTAL DEPTH: 69 ft.
CASING TYPE: 316 Stainless Steel	SCREEN TYPE: 316 Stainless Steel	SCREENED INTERVAL: 61.8-66.8	

GROUND WATER DATA					CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	REMARKS	TYPE		NX	SS	
04/27/89	1629	25.58		DIAMETER		3in OD	2inOD	
05/03/89	-	26.60		HAMMER			300lb.	
/ /				FALL			30in	

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
55				Augered without sampling 0-55.5ft., see WELL LOG MP-235 for lithologic description.	55	
56	S-1	14 25 21	18	GLACIAL TILL: brown to gray: sandy silt clay. few gravel: hard: dry to moist.	56	
57		18 34				
58	S-2	34 53	0			
59		16 20				
60	S-3	25 25	44	SANDY SILT: gray: fine to coarse sand, dense, wet.	60.5 0.6	

REMARKS: Located at SE corner of SCMF No. 6 TOC Elevation (measuring reference point)
914.99 ft. (5/8/89)

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
5 1/2 N. State Street
Westerville, Ohio 43081

Page 2 of 2

JOB NO: 321-136

BOREHOLE: MP-235R

ACT: Comprehensive Monitoring Program

LOCATION: N: 5235.16 E: 6353.61

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
61		6		GLACIAL TILL: as above.	2.4'	
62	S-4	12 31 25	14			
63	S-5	200	6			
64				BEDROCK: interbedded gray/green calcareous shale and fossiliferous limestone: 63.5-64.5 ft. is weathered shale in gray clay matrix: bed thicknesses range from 0.1-0.5 ft.	Core interval= 64-69 ft. Recovery=100% RQD = 10%	5.5' 64'
65						
66						
67						
68						
69						

REMARKS:



THE H. C. NUTTING COMPANY

GEOTECHNICAL AND TESTING ENGINEERS

SINCE 1921

4120 AIRPORT ROAD • P.O. BOX C • CINCINNATI, OHIO 45226 • 513-321-5816
912 MORRIS STREET • CHARLESTON, WEST VIRGINIA 25301 • 304-344-0821
BOX NUMBER 11 • HIGHLAND HEIGHTS, KENTUCKY 41076 • 606-261-2043

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TEST BORING REPORT

05-15-84mp

P.O. #1615

Page 1 of 2

CLIENT CECOS International, Inc. ORDER No. 8454.025
PROJECT Installation of Monitoring Wells, Aber Road Facility, HOLE No. MP 237
Clermont County, Ohio
LOCATION As staked by client and as shown on plan

DRILLER W. Martin & H. Herd DRILL No. 36 DATE STARTED 5-7-84
Inspectors B. Johnson & E. Alder
ELEVATION REFERENCE Provided by client DATE COMPLETED 5-9-84
CASING: DIAMETER 3.25" I.D. Hollow Stem Auger HAMMER WT. FALL
SAMPLER: DIAMETER & TYPE 2" I.D. Split Spoon HAMMER WT. 300# FALL 30"
DEPTH TO WATER: IMMEDIATE UPON COMPLETION
DEPTH TO WATER DAYS AFTER COMPLETION WATER USED IN DRILLING

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
911.9	0.0'						
	6.0'	Brown sandy silty clay with gravel and rock fragments, moist - stiff	1	0-1.5	SS	10-12-14	18"
			2	1.5-3	SS	13-14-18	18"
			3	3-4.5	SS	8-9-10	18"
			4	4.5-6	SS	9-10-10	18"
905.9	6.0'		5	6-7.5	SS	3-3-3	18"
	6.0'	Mottled brown and gray silty clay, moist - medium stiff	6	7.5-9	SS	3-2-3	18"
			7	9-10.5	SS	2-2-3	18"
			8	10.5-12	SS	2-5-9	18"
899.9	12.0'		9	12-13.5	SS	11-23-23	18"
	3.0'	Brown sandy silty clay with gravel and rock fragments, moist - stiff	10	13.5-15	SS	14-24-26	18"
896.9	15.0'		11	15-16.5	SS	15-22-20	18"
	9.0'	Gray sandy silty clay with gravel and rock fragments, moist - stiff	12	16.5-18	SS	10-15-16	18"
			13	18-19.5	SS	8-16-17	18"
			14	19.5-21	SS	10-19-19	14"
			15	21-22.5	SS	7-10-11	18"
			16	22.5-24	SS	6-12-13	18"
887.9	24.0'		17	24-25.5	SS	7-14-41	18"
	6.0'	Brown sandy silty clay with gravel and rock fragments, moist - stiff	18	25.5-27	SS	21-63-95	18"
			19	27-28	SS	27-86	12"
			20	28-29	SS	30-59	12"
			21	29-30	SS	21-43	12"

881.9 30.0'

Respectfully submitted,

THE H. C. NUTTING CO.

Samples recovered from this test boring are available for inspection, which is strongly recommended. The company assumes no responsibility for the use of the data.

PROJECT: Installation of Monitoring Wells, Aber Road Facility, HOLE No. MP 237
Clermont County, Ohio

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
881.9	30.0'						
		29.0' Gray silty sandy clay with gravel and rock fragments, moist - hard	22	30-31.5	SS	20-39-42	18"
			23	31.5-33	SS	15-20-29	18"
			24	33-34.5	SS	10-16-21	18"
			25	34.5-36	SS	10-15-24	18"
			26	36-37.5	SS	9-16-24	18"
			27	37.5-39	SS	12-19-26	18"
			28	39-40	SS	13-18	12"
			29	40-41.5	SS	9-12-23	18"
			30	41.5-43	SS	11-16-26	18"
			31	43-44.5	SS	10-16-20	18"
			32	44.5-46	SS	11-17-20	18"
			33	46-47.5	SS	12-16-19	18"
			34	47.5-49	SS	9-12-19	18"
			35	49-50	SS	9-14	12"
			36	50-51.5	SS	8-13-15	18"
			37	51.5-53	SS	9-12-17	18"
			38	53-54.5	SS	8-11-13	18"
			39	54.5-56	SS	7-10-13	18"
			40	56-57.5	SS	6-11-17	18"
			41	57.5-59	SS	10-15-32	18"
852.9	59.0'	10.0' Gray shale with limestone layers	42	59-59.2 59-69	SS Core	125 85%	0"
842.9	69.0'						
		BORING COMPLETED					
		Set 10' (2") well screen 69.0'-59.0'					
		Set 11' sand pack 69.0'-58.0'					
		Set 1' Bentonite seal 58.0'-57.0'					
		Grouted 57.0'-0'					
		2' stick up					
		Used 71 (2") PVC screen and pipe					

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

Page 1 of 2

JOB NO: 321-136

BOREHOLE: MP-238AR

PROJECT: Comprehensive Monitoring Program		LOCATION: N: 5375.86 E: 5999.42	
DRILL CONTRACTOR: Penn Drill		RIG TYPE: Mobile B-53 ATV	
GWA GEOLOGIST: Norm Gardner		DRILLER: Jim Saccani	
DATE START: 3 /17/89	DATE FINISH: 3 /19/89	GRADE ELEVATION: 913.9	TOTAL DEPTH: 31.5ft.
CASING TYPE: 316 Stainless Steel	SCREEN TYPE: 316 Stainless Steel	SCREENED INTERVAL: 25-30 ft.	

GROUND WATER DATA					CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	REMARKS	TYPE			SS	
04/26/89	1702	21.27		DIAMETER			2in. OD	
04/27/89	1428	21.33		HAMMER			300lb	
/ /				FALL			30in.	

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
				0-15.5 ft. augered without sampling, see WELL LOG MP-238A for lithologic description.		
16	S-1	9 17 20 44	18	GLACIAL TILL: gray: mostly silt and clay, trace gravel and sand: hard: dry to moist.	15.7-15.8ft. = sandy clay. brown, moist.	
17						
18		7 9				
19	S-2	11 13	24			
20		7 9		SILTY SAND: brown, loose: moist to wet. 19.5		
21	S-3	11 13	24	GLACIAL TILL: as above. 20.0		

REMARKS: Located at SW corner of SCMF NO. 6 TOC Elevation (measuring reference point) 916.51 ft. (5/10/89)

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

Page 2 of 2

OB NO: 321-136

BOREHOLE: MP-238AR

CT: Comprehensive Monitoring Program

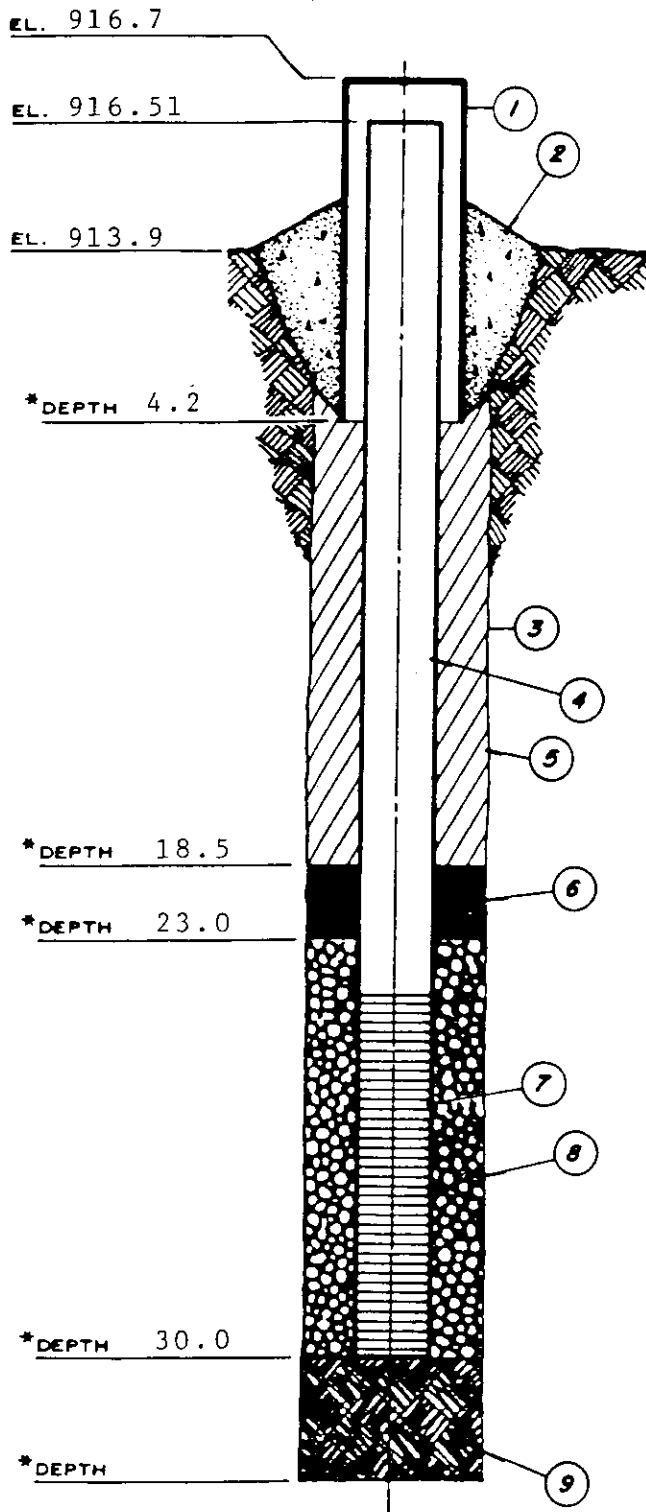
LOCATION: N: 5375.86 E: 5999.42

EPH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
22		5		GLACIAL TILL: continued.		
	S-4	7	24			
23		11				
		10				
		5				
24		7				
	S-5	11	24			
25		11				
		5				
26		15				
	S-6	38	24			
27		58				
				SILTY SAND: brown: med to coarse sand, trace gravel: loose: wet.	27.0 27.5	
28	S-7	22 60 200/4	16	GLACIAL TILL: brown: mostly silty clay, trace gravel and rock fragments: hard: dry to moist.		
29						
30	S-8	56 94 126	18			
31		200/0				
32				Sampled to 31.5 ft., Augered to 30 ft.		

REMARKS:

MONITOR WELL COMPLETION REPORT :

WELL N^o MP-238AR JOB N^o 321-136
 PROJECT Comprehensive Monitoring Pro
CECOS - Aber Road



1. PROTECTIVE CASING I.D. 4 INCHES.

2. SURFACE SEAL TYPE Concrete

3. BOREHOLE DIAMETER 10 INCHES.

4. RISER PIPE:

a. Type 316 Stainless Steel

b. I.D. 2 INCHES

c. Length 27.5 FEET

d. Joint Type Flush Thread

5. BACKFILL:

a. Type 5% Bentonite Cement Grout

b. Installation Side Discharge Tremie

6. Type of SEAL Bentonite Pellet

7. SCREEN:

a. Type 316 Stainless Steel

b. I.D. 2 INCHES

c. Slot Size 0.010 INCHES

d. Length 5 FEET

8. SCREEN FILTER TYPE #4 Silica Sand

9. BACKFILL TYPE #4 Silica Sand

*Depth in feet below grade.

Field Number MP-238R
May 1986

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

TEST BORING RECORD

Driller Peter E. Martin

Hole No. 238

Surface
Elevation

Sheet 1 of 2

Water Level

1.934

Browning-Ferris Industries, Inc.
CECOS Aber Road Facility

1 hr. 24 hrs.

Location.

CECOS Aber Road Facility
Williamsburg, Ohio

Casing Hammer Wt.	lbs.	Drop	
-------------------	------	------	--

Started

11/19/85 Completed 11/20/85 Job No. 85147-1

Sampler Hammer Wt. 140 lbs. Drop 30

Sampler Size 2 in O.D. Casing Size 8

[illegible]

TEST BORING RECORD

Sheet. 2 of 2

Sampler Size 2 in O.D. Casing Size 8

Completed 11/20/85 Job No. 85147-1

[illegible]

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

Page 1 of 4

OB NO: 321-136

BOREHOLE: MP-239B

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 5626.57 E: 5998.28

RILL CONTRACTOR: Penn Drill

RIG TYPE: Mobile B-53 ATV

WA GEOLOGIST: Scott Beasley

DRILLER: Jim Saccani

ATE START: 3 /29/89

DATE FINISH: 3 /31/89

GRADE ELEVATION: 913.0

TOTAL DEPTH: 39 ft.

ASING TYPE: 316 Stainless Steel

SCREEN TYPE: 316 Stainless Steel

SCREENED INTERVAL: 17-22

GROUND WATER DATA					CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	REMARKS	TYPE			SS	
4/01/89	1108	21.98	before develop.	DIAMETER			2in OD	
4/27/89	1447	8.05		HAMMER			140/300	
/ /				FALL			30in	

EPH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
1	S-1	1 3 9 11	24	GLACIAL TILL: brown and gray: mostly silt and clay, few fine to coarse sand and gravel: firm: moist.		
2		6 7				
3	S-2	14 14	22			
4		14 10				
5	S-3	10 12	6			
6		4 7				
7	S-4	9 9	0		NO recovery on two attempts, cuttings indicate glacial till.	

REMARKS: Used 140 lb. hammer 0-29.5ft. due to faulty 300 lb. hammer. Switched to 300 lb. hammer at 29.5 feet. TOC Elevation (measuring reference point) 915.65 ft. (5/10/89)

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

Page 2 of 4

WB NO: 321-136

BOREHOLE: MP-239B

CT: Comprehensive Monitoring Program

LOCATION: N: 5626.57 E: 5998.28

BOREHOLE LOG

BOREHOLE LOG						
DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
3		13		GLACIAL TILL: continued.		
		12				
9	S-5	15	8			
		18				
10		8		Turns hard at 12 feet.		
		9				
11	S-6	11	24			
		12				
12		14				
		46				
13	S-7	54	24			
		75				
14		60				
		54				
15	S-8	74	24			
		86				
16		20		Turns gray at 16.7 feet		
		32				
17	S-9	50	24			
		50				
18		16				
		33				
19	S-10	51	22			
		47				
				19.8-20.0 = SAND AND GRAVEL: brown, fine to coarse sand, some gravel: loose: wet.		

REMARKS:

JOB NO: 321-136

BOREHOLE: MP-239B

CT: Comprehensive Monitoring Program

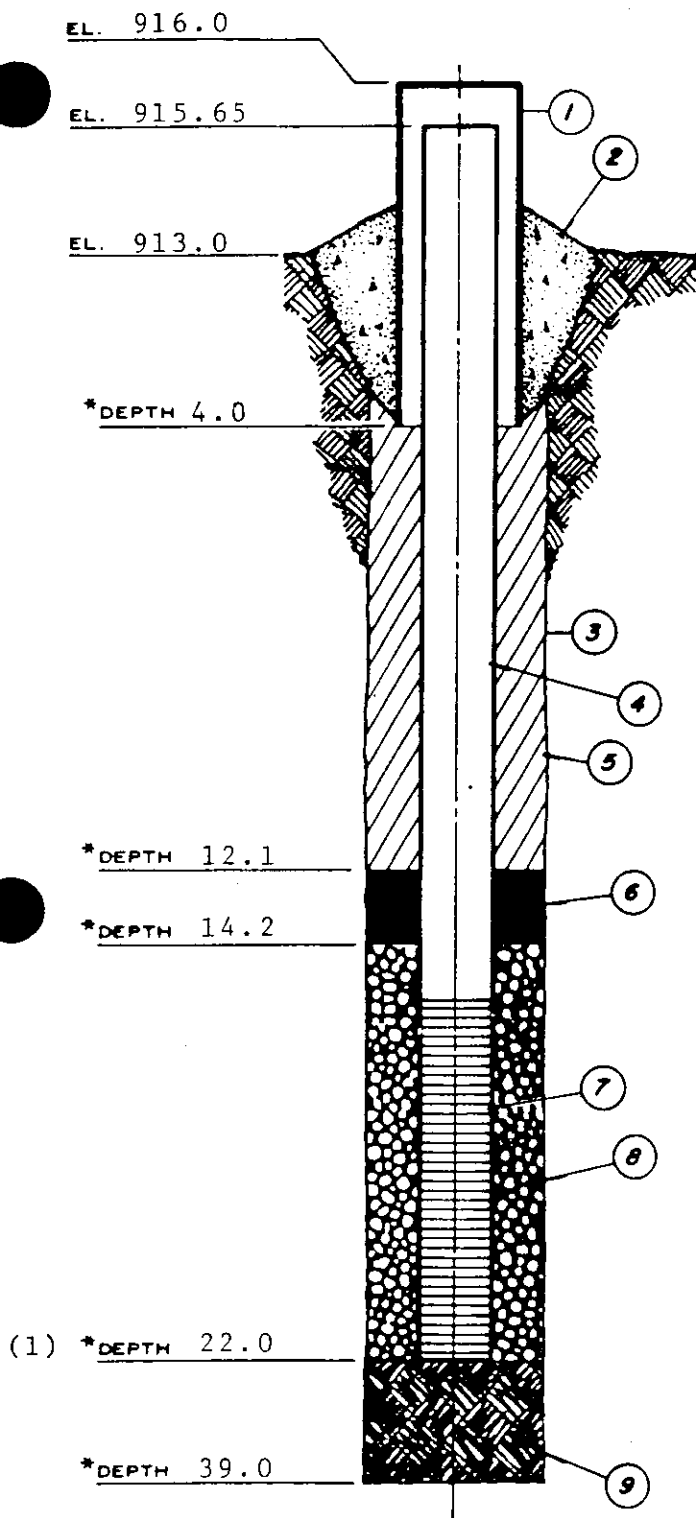
LOCATION: N: 5626.57 E: 5998.28

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
20		12		GLACIAL TILL: gray, mostly silt and clay with few fine to coarse sand and gravel, firm to very hard, moist.		
		21				
21	S-11	26	24			
		40				
22		15				
		25				
23	S-12	29	24			
		31				
24		14				
		23				
25	S-13	32	24			
		42				
26		13				
		26				
27	S-14	48	24			
		63				
28		31				
		114				
29	S-15	196	18			
		6				
30	S-16	46	18		Switched to 300lb. hammer.	
		144				
31		40				
	S-17	90	18			
		177/6			Total of over 300 blows	

REMARKS:

MONITOR WELL COMPLETION REPORT :

WELL N^o MP-239B JOB N^o 321-136
 PROJECT Comprehensive Monitoring Program
CECOS - Aber Road



*Depth in feet below grade.

1. PROTECTIVE CASING I.D. 6 INCHES.
 2. SURFACE SEAL TYPE Concrete
 3. BOREHOLE DIAMETER 12 INCHES.
 4. RISER PIPE:
 - a. Type 316 Stainless Steel
 - b. I.D. 4 INCHES
 - c. Length 20 FEET
 - d. Joint Type Flush Thread
 5. BACKFILL:
 - a. Type 5% Bentonite Cement Grout
 - b. Installation Side Discharge Tremie
 6. Type of SEAL Bentonite Pellet
 7. SCREEN
 - a. Type 316 Stainless Steel
 - b. I.D. 4 INCHES
 - c. Slot Size 0.010 INCHES
 - d. Length 5 FEET
 8. SCREEN FILTER TYPE #4 Silica Sand
 9. BACKFILL TYPE #4 Silica Sand
- (1) 2.9 foot reservoir at bottom of screen

Field Number MP-240R
May 1986

TEST BORING RECORD

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

Driller James McCann
Water Level

Hole No. 240

Surface
Elevation

Sheet 1 of 2

For Browning-Ferris Industries, Inc.
CECOS Aber Road Facility

Location Williamsburg, Ohio

Started 12/2/85

Completed

12/4/85

Job No. 95147-1

1 hr. 24 hrs.

Casing Hammer Wt. lbs. Drop 30 in.

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Sampler Size 2 in O.D. Casing Size 8" in.

ELEVATION	DEPTH	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/6" Penetration on Sampler
	0.0						
	14.0		14.0' Stiff Brown Silty Clay with Rock Fragments with Some Gray Seams of Silty Clay, Moist				
	27.0		13.0' Brown Silty Clay, Moist				
	30.0		3.0' Stiff Gray Silty Clay with Small Gravels, Moist - Till				
	33.0		3.0' Gray Sand, Gravel, Wet				
	50.0		26.0' Very Stiff Gray Silty Clay with Small Gravel, Moist				

(Continued)

TEST BORING RECORD

Sampler Size 2 in O.D. Casing Size 8 in.

Started

Williamsburg, Ohio

Job No. 85147-1

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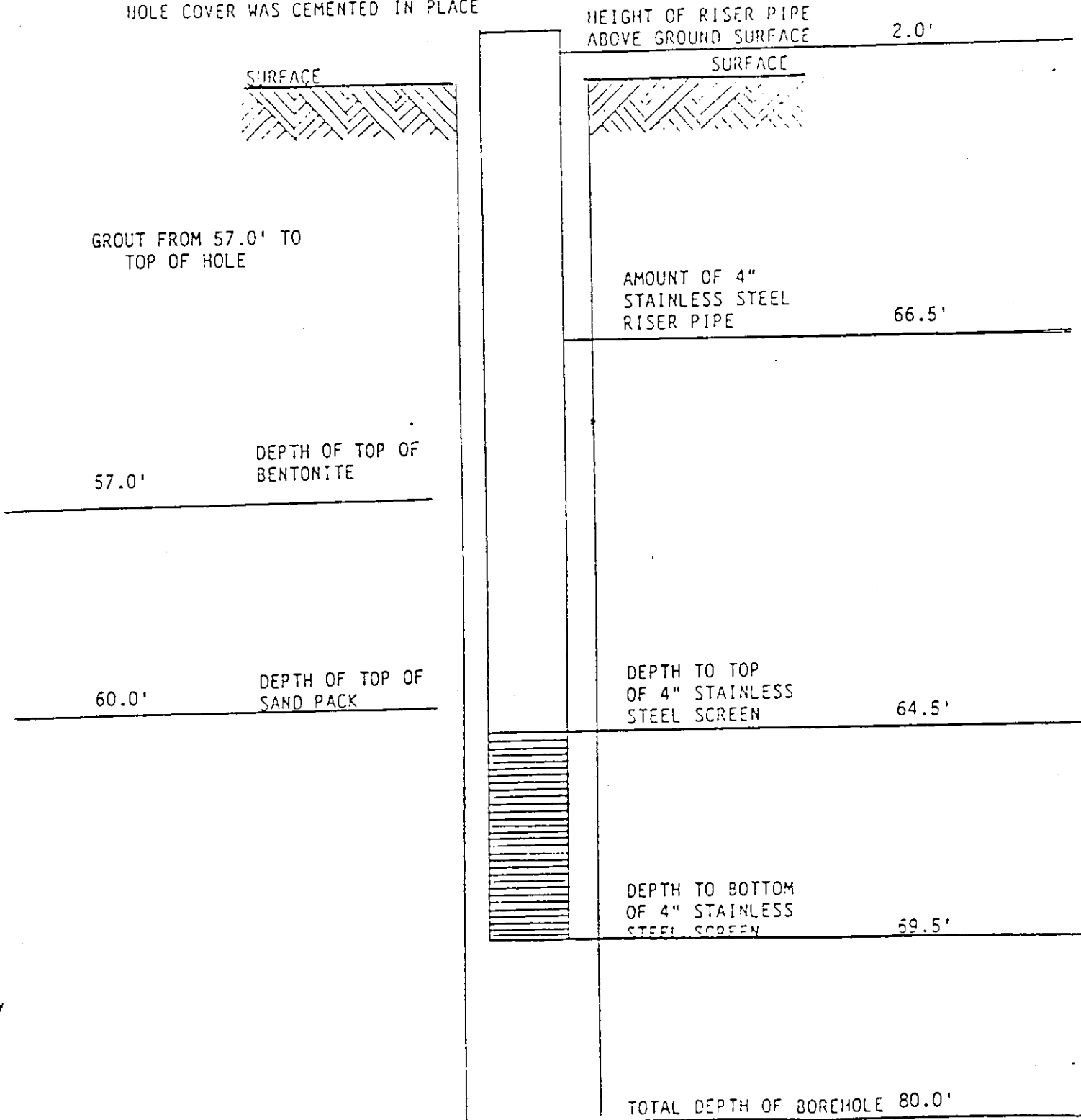
Field Number MP-240R
May 1986

MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 240

DATE COMPLETED 12/4/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE



Field Number MP-240R1
May 1986

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

TEST BORING RECORD

Driller Dave Newman

Hole No. 240
For

Surface
Elevation

Sheet 1 of 2

Water Level

Browning-Ferris Industries, Inc.

1 hr. 24 hrs.

Casing Hammer Wt. lbs. Drop in.

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Sampler Size 2 in O.D. Casing Size 8 in.

Location

CECOS Aber Road Facility

Williamsburg, Ohio

Started 12/11/85

Completed 12/12/85

Job No. 85147-1

ELEVATION	DEPTH	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/6" Penetration on Sampler
	0.0						
	14.0		14.0' Stiff Brown Silty Clay with Rock Fragments, Moist				
	27.0		13.0' Brown Silty Clay, Moist				
	30.0		3.0' Till, Stiff Gray Silty Clay with Small Gravel, Moist				
	33.0		3.0' Gray Sand & Gravel, Wet				
	50.0		26.0' Stiff Gray Silty Clay with Small Gravel				

(Continued)

May 1986

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

Water Level

1 hr.	24 hrs.
-------	---------

Casing Hammer Wt.	lbs	Drop	in.
140		30	

Sampler Hammer Wt.	140	lbs.	Drop	30	in.
--------------------	-----	------	------	----	-----

Sampler Size 2 in O.D. Casing Size 8 in.

Hole No.

for

Location

Started

240

Surface
Elevation

Sheet

2

est.

2

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Completed

Job No. 85147-1

[illegible]

Field Number **MP-241 AR**
May 1986

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

TEST BORING RECORD

James McCann

Hole No. 241-A Surface Elevation Sheet 1 of 1

Water Level

Browning-Ferris Industries, Inc.

1 hr. 24 hrs.

CECOS Aber Road Facility

Casing Hammer Wt.	lbs.	Drop	ft.
-------------------	------	------	-----

Location Williamsburg, Ohio

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Started 12/2/85 Completed 12/2/85 Job No. 35147-1

Sampler Size 2 in O.D. Casing Size 8 in.

[illegible]

Field Number WF-241AR
May 1986

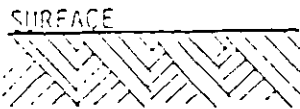
MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 241-A

DATE COMPLETED 12/2/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE

HEIGHT OF RISER PIPE
ABOVE GROUND SURFACE 2.0'



GROUT FROM 17.0' TO
TOP OF HOLE

17.0' DEPTH OF TOP OF
BENTONITE

19.0' DEPTH OF TOP OF
SAND PACK

AMOUNT OF 4"
STAINLESS STEEL
RISER PIPE 25.0'

DEPTH TO TOP
OF 4" STAINLESS
STEEL SCREEN 23.0'

DEPTH TO BOTTOM
OF 4" STAINLESS
STEEL SCREEN 28.0'

TOTAL DEPTH OF BOREHOLE 30.0'

Field Number MP-241R
May 1986

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

TEST BORING RECORD

Driller James McCann

File No.
for

241

**Surface
Elevation**

Sheet 1

of 2

Water Level

1 hr.

24 hrs.

Casing Hammer Wt.

lbs. Drop

in

Location

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Sampler Hammer Wt.

140

lbs. Drop

30

in.

Started

11/25/85

Completed

11/26/85

Job No. 85147-1

Sampler Size

2

in $O(\Gamma)$

Casing Size

8

іт.

ELEVATION	DEPTH 0.0	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/6" Penetration on Sampler
	15.0		15.0' Brown Silty Clay				
	19.0		4.0' Gray & Brown Sand				
	24.0		5.0' Very Stiff Brown Silty Clay				
	27.0		3.0' Gray Sand & Gravel				
	50.0		26.0' Very Stiff Silty Clay with Gravel - Till				
			(Continued)				

Field Number MP-241R
May 1986

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

TEST BORING RECORD

Driller James McCann

Water Level

1 hr. 24 hrs.

Casing Hammer Wt.	140	lbs	Drop	20	in.
-------------------	-----	-----	------	----	-----

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Sampler Size 2 in O.D. Casing Size 8 in.

Hole No.
for

241 Surface Elevation

Sheet 2 of 2

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Completed

Job No. 85147-1

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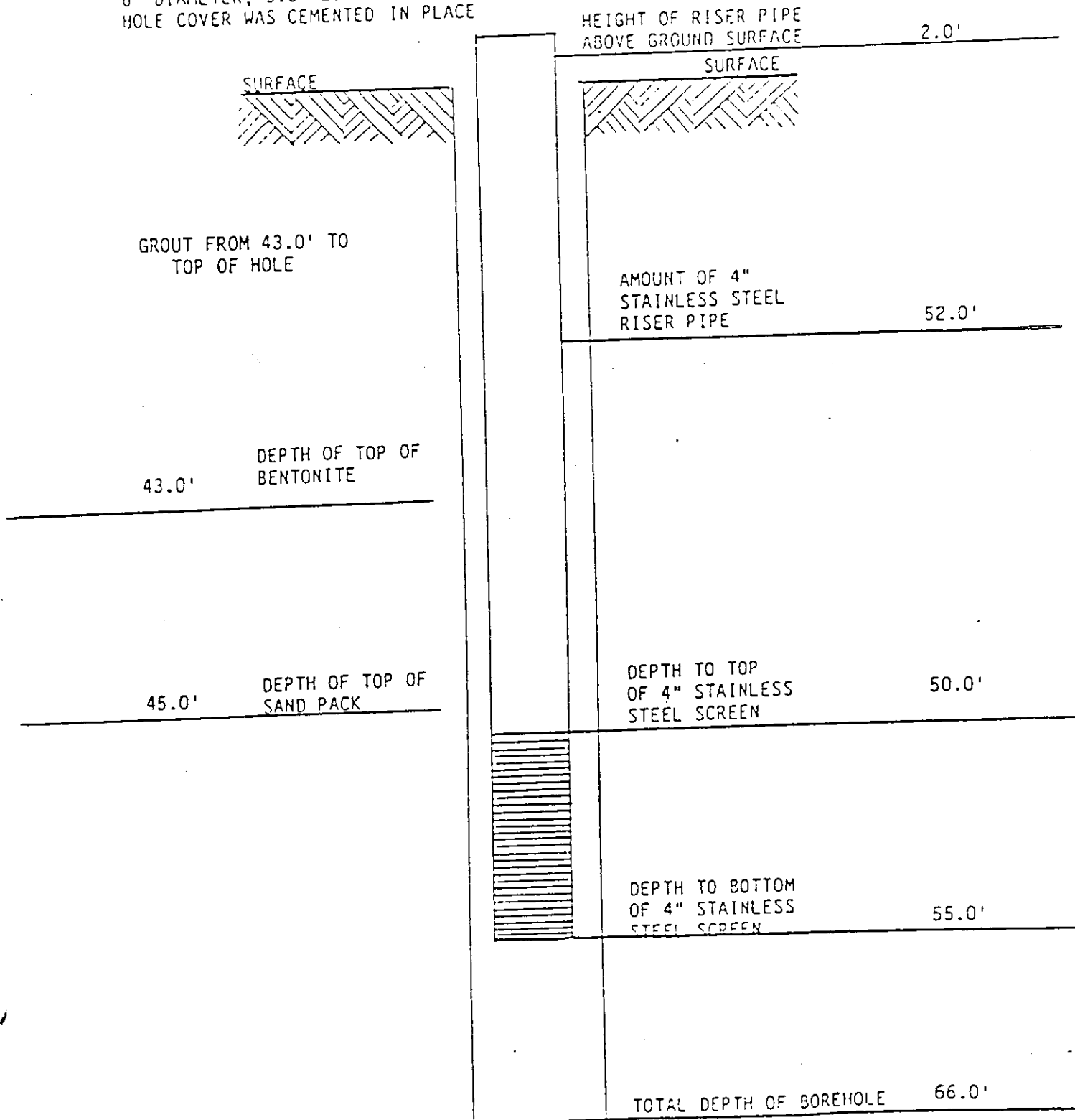
Field Number MP-241R
May 1986

MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 241

DATE COMPLETED 11/26/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE





THE H. C. NUTTING COMPANY

GEOTECHNICAL AND TESTING ENGINEERS

SINCE 1921

4120 AIRPORT ROAD • P.O. BOX C • CINCINNATI, OHIO 45226 • 513-321-5816
912 MORRIS STREET • CHARLESTON, WEST VIRGINIA 25301 • 304-344-0821
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TEST BORING REPORT

6-5-84 vf

P.O.#1615

Page 1 of 4

CLIENT CECOS International, Inc. ORDER No. 8454.025
PROJECT Installation of Monitoring Wells, Aber Road Facility, HOLE No. MP242
Clermont County, Ohio
LOCATION _____
DRILLER W. Martin DRILL No. 36 DATE STARTED 5-25-84
Inspector - B. Johnson DATE COMPLETED 5-29-84
ELEVATION REFERENCE _____
CASING: DIAMETER 3.25" I. D. Hollow Stem Auger HAMMER WT. _____ FALL _____
SAMPLER: DIAMETER & TYPE 2" O. D. Split Spoon HAMMER WT. 300# FALL 30"
DEPTH TO WATER: IMMEDIATE 16.0' UPON COMPLETION _____
DEPTH TO WATER * DAYS AFTER COMPLETION _____ WATER USED IN DRILLING _____

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
	0'						
	1.5'	1.5' Brown silty clay, moist - soft	1	0-1.5	SS	2-3-3	18"
	6.0'	6.0' Mottled brown and gray silty clay, moist - stiff	2	1.5-3	SS	2-3-4	18"
			3	3-4.5	SS	2-2-3	18"
			4	4.5-6	SS	2-3-4	18"
			5	6-7.5	SS	3-3-5	18"
	7.5'	4.5' Brown silty sandy clay with gravel and rock fragments, moist - hard	6	7.5-9	SS	3-4-12	18"
			7	9-10.5	SS	11-21-37	18"
			8	10.5-12	SS	14-20-28	18"
	12.0'	1.5' Gray silty sandy clay with gravel and rock fragments, moist - hard	9	12-13.5	SS	10-16-19	18"
	13.5'	6.0' Brown silty sandy clay with gravel and rock fragments, moist - hard, 1.5" sand seam at 16.5'	10	13.5-15	SS	12-30-49	18"
			11	15-16.5	SS	12-22-18	18"
			12	16.5-18	SS	9-18-24	18"
	19.5'		13	18-19.5	SS	10-20-29	18"

US 014729

Respectfully submitted,

THE H. C. NUTTING CO.

Samples recovered from this test boring are available for inspection, which is strongly recommended. The company assumes no responsibility for interpretation.

PROJECT Installation of Monitoring Wells, Aber Road Facility, HOLE No. MP242
Clermont County, Ohio

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
	19.5'						
33.0'	13.5'	Gray silty sandy clay with gravel and rock fragments, moist - hard ①	14	19.5-21	SS	11-20-32	18"
			15	21-22.5	SS	8-13-14	18"
			16	22.5-24	SS	8-18-18	18"
			17	24-25.5	SS	12-15-17	18"
			18	25.5-27	SS	10-13-17	18"
			19	27-28.5	SS	8-13-14	18"
			20	28.5-30	SS	8-13-13	18"
			21	30-31.5	SS	8-12-14	18"
			22	31.5-33	SS	12-15-15	18"
	15.0'	Gray silty sandy clay with gravel and rock fragments, moist - hard, 1" sand seam at 32.0'	23	33-34.5	SS	8-11-12	18"
			24	34.5-36	SS	7-9-10	18"
			25	36-37.5	SS	7-10-10	18"
			26	37.5-39	SS	6-8-9	18"
			27	39-40.5	SS	7-8-8	18"
			28	40.5-42	SS	5-7-8	18"
			29	42-43.5	SS	6-10-10	18"
			30	43.5-45	SS	6-6-7	18"
			31	45-46.5	SS	5-6-6	18"
			32	46.5-48	SS	5-8-10	18"
	7.5'	Gray fine to coarse sand and gravel, wet - very dense ⑦	33	48-49.5	SS	9-12-15	15"
			34	49.5-51	SS	3-3-3	18"
			35	51-52.5	SS	4-7-8	18"
			36	52.5-54	SS	5-30-16	18"
			37	54-55.5	SS	9-17-14	15"
55.5'	45.5'	Gray silty sandy clay with gravel and rock fragments, moist - hard, 1" sand seam at 97.0' ③	38	55.5-57	SS	12-18-25	18"
			39	57-58.5	SS	12-12-21	18"
			40	58.5-60	SS	12-17-22	18"
			41	60-61.5	SS	8-15-24	18"
			42	61.5-63	SS	10-18-22	18"
			43	63-65	SS	9-24-35-44	24"
			44	65-67.5	SS	12-18-24-36	96
			45	67.5-70	SS	8-13-22-30	40 3
			46	70-72.5	SS	7-13-19-25	40 3
			47	72.5-74	SS	8-13-25	18"
			48	74-75.5	SS	8-14-27	18"
			49	75.5-77	SS	7-11-17	18"
			50	77-78.5	SS	7-13-19	18"
			51	78.5-80	SS	8-14-16	18"
			52	80-81.5	SS	9-17-21	18"
			53	81.5-83	SS	12-16-20	18"
			54	83-84.5	SS	13-18-22	18"
			55	84.5-86	SS	12-17-18	18"

: US-014730

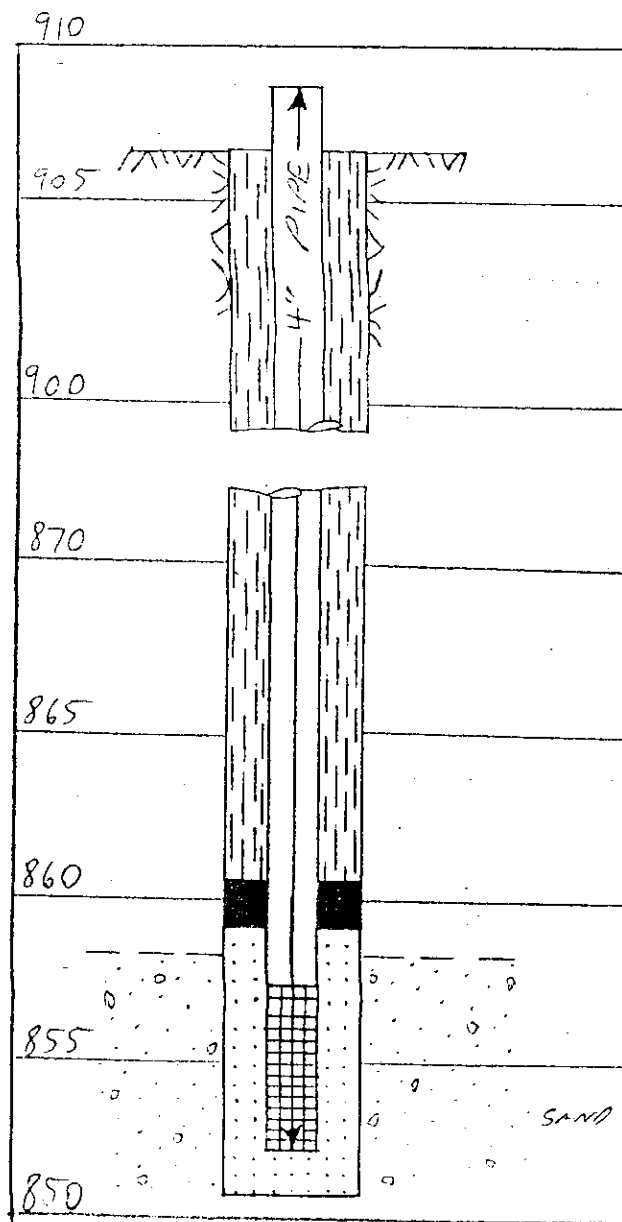
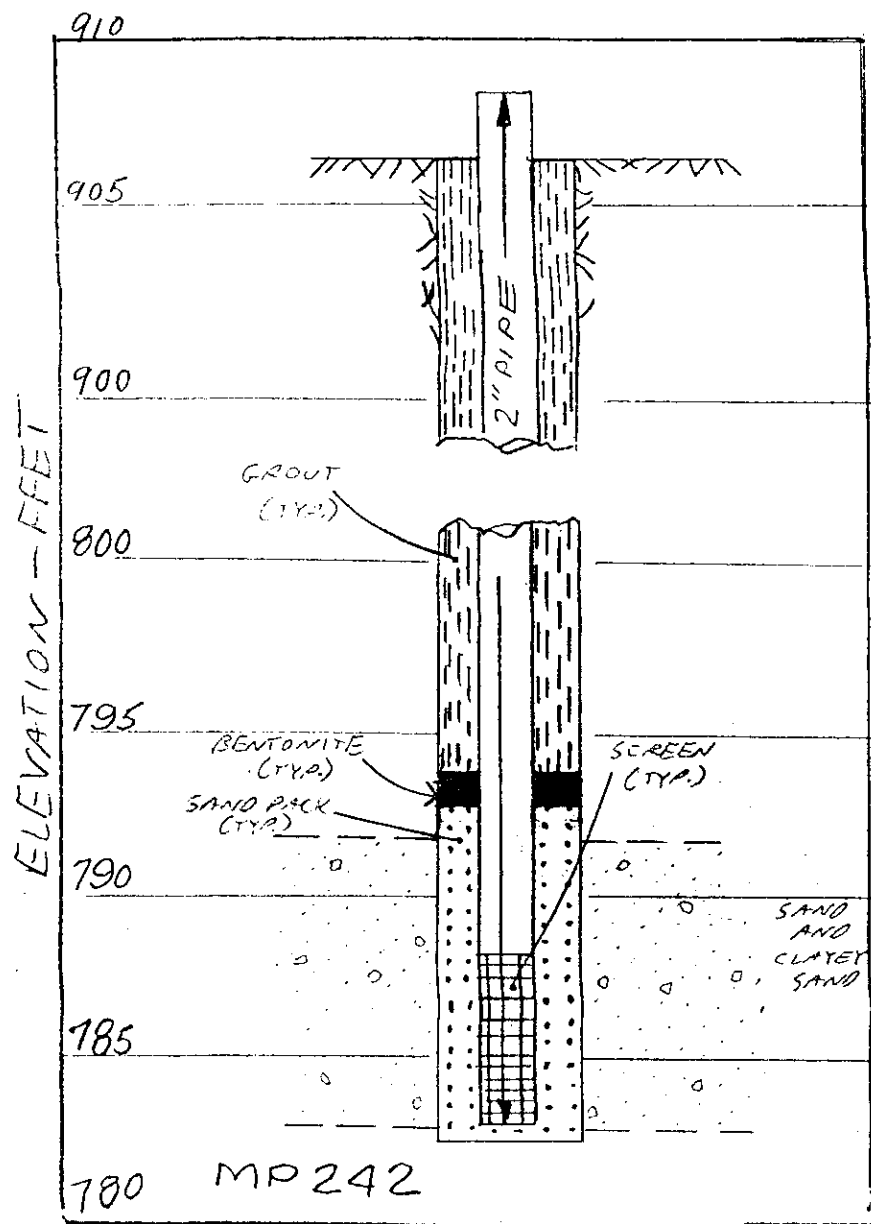
PROJECT Installation of Monitoring Wells, Aber Road Facility, HOLE No. MP242
Clermont County, Ohio

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
			56	86-87.5	SS	12-16-17	18"
			57	87.5-89	SS	8-19-20	18"
			58	89-90.5	SS	7-16-19	18"
			59	90.5-92	SS	6-11-17	18"
			60	92-93.5	SS	6-11-18	18"
			61	93.5-95	SS	6-11-16	18"
			62	95-96.5	SS	11-21-33	18"
			63	96.5-98	SS	13-27-38	18"
			64	98-99.5	SS	12-20-33	18"
			65	99.5-101	SS	12-19-30	18"
101.0'	4.5'	Brown and gray silty sandy clay with fine gravel, moist - hard, 1.5" sand seam at 104.0'	66	101-102.5	SS	7-11-16	18"
			67	102.5-104	SS	7-10-16	18"
			68	104-105.5	SS	7-8-10	18"
105.5'	1.5'	Gray sandy silt, very moist - medium dense	69	105.5-107	SS	6-9-14	15"
107.0'	6.0'	Gray silty sandy clay, moist - stiff	70	107-108.5	SS	6-10-15	18"
			71	108.5-110	SS	6-11-15	18"
			72	110-111.5	SS	7-12-17	18"
			73	111.5-113	SS	8-12-20	18"
113.0'	1.5'	Gray sandy silt very moist - dense	74	113-114.5	SS	7-10-15	18"
114.5'	3.0'	Brown clayey fine to coarse sand and gravel, wet - dense	75	114.5-116	SS	7-10-15	18"
			76	116-117.5	SS	8-11-15	18"
117.5'	12.0'	Gray fine to coarse sand and gravel, wet - dense	77	117.5-119	SS	8-11-13	18"
			78	119-120.5	SS	8-11-14	18"
			79	120.5-122	SS	11-16-22	16"
			80	122-123.5	SS	15-24-38	18"
123.5'	0.5'	Gray shale with limestone layers	81	123.5-124	SS	120	6"
124.0'		BORING COMPLETED					

US.014731

ECT Installation of Monitoring Wells, Aber Road Facility, HOLE No. MP242
 Clermont County, Ohio

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
		<p>Set 5' (2") well screen 123.5'-118.5'</p> <p>Set 10' sand pack 123.5'-113.5'</p> <p>Set 1' Bentonite seal 113.5'-112.5'</p> <p>Grouted 1 12.5'-0'</p> <p>2' stick up</p> <p>Used 125.5' (2") PVC screen and pipe</p> <p>*Water came to within 2.0' of surface when drilled to 114.0' immediately</p> <p>Checked water 5-28-84 AM and water 5.0' below surface</p> <p>Water running out of top of PVC pipe on 5-29-84</p>					



242A12

PENNSYLVANIA DRILLING COMPANY

TEST BORING RECORD

PITTSBURGH, PA. 15220

Driller James McCann

Hole No. 242-A Surface Elevation Sheet 1 of 2

Driller Level

For Browning-Ferris Industries, Inc.

1 hr. 24 hrs.

CECOS Aber Road Facility

Casing Hammer Wt. 140 lbs. Drop 30 in.

Location Williamsburg, Ohio

Sampler Hammer Wt. 2 in O.D. Casing Size 8" in.

Started 12/4/85

Completed 12/5/85

Job No. 85147-1

ATION	DEPTH	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blow 26" Penetration on Sampler
	0.0						
	17.0		17.0' Stiff Brown Silty Clay, Moist				
	46.0		29.0' Very Stiff Gray Silty Clay with Small Gravel & Limestone, Moist				
	50.0		6.0' Gray Sand & Gravel, Wet				
			(Continued)				

242AR

TEST BORING RECORD

Jub No. 85147-1

Completed

[illegible]

May 1986

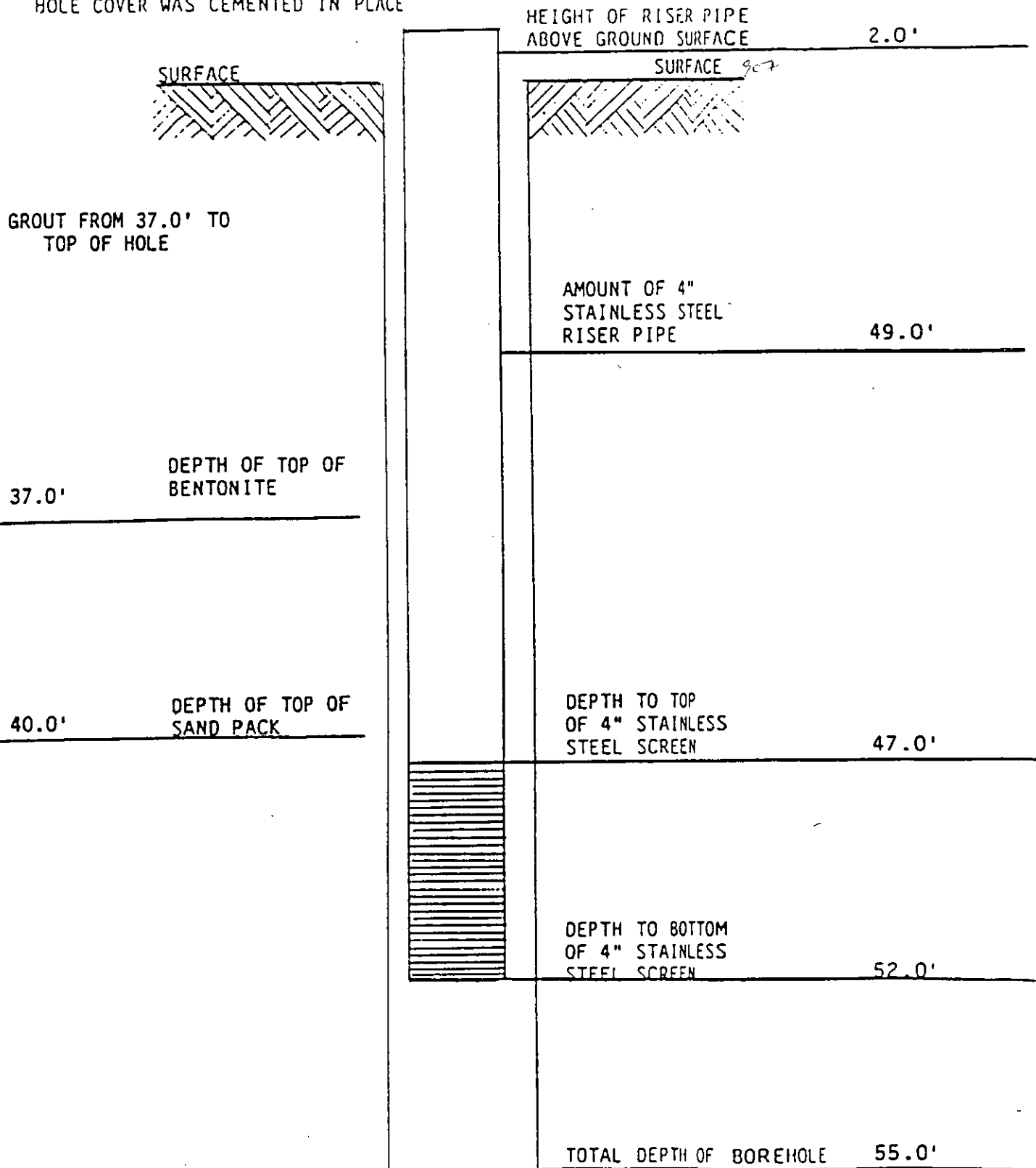
242A/R

MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 242-A

DATE COMPLETED 12/5/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE





THE H. C. NUTTING COMPANY

GEOTECHNICAL AND TESTING ENGINEERS

SINCE 1921

4120 AIRPORT ROAD • P.O. BOX C • CINCINNATI, OHIO 45226 • 513-321-5816
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6-5-84 vf

P.O.#1615

Page 1 of 2

TEST BORING REPORT

CLIENT CECOS International, Inc. ORDER No. 8454.025

OBJECT Installation of Monitoring Wells, Aber Road Facility, HOLE No. MP243
Clermont County, Ohio

LOCATION As staked by client and as shown on plan

DRILLER J. Martin DRILL No. 29 DATE STARTED 5-31-84
Inspector - B. Johnson

ELEVATION REFERENCE Provided by client DATE COMPLETED 6-1-84

TESTING: DIAMETER 3" Hollow Stem Auger HAMMER WT. FALL

SAMPLER: DIAMETER & TYPE 2" O. D. Split Spoon HAMMER WT. 140# FALL 30"

DEPTH TO WATER: IMMEDIATE 27.0' UPON COMPLETION

DEPTH TO WATER DAYS AFTER COMPLETION WATER USED IN DRILLING

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
871.5	0'						
	4.5'	Brown silty clay, moist - soft	1	0-1.5	SS	1-2-2	18"
			2	1.5-3	SS	2-2-3	18"
			3	3-4.5	SS	4-6-7	18"
877.0	4.5'		4	4.5-6	SS	9-19-37	18"
	3.0'	Brown silty sandy clay with gravel and rock fragments, moist - stiff	5	6-7.5	SS	19-42-71	18"
874.0	7.5'		6	7.5-9	SS	20-29-34	18"
	13.5'	Gray silty sandy clay with gravel and rock fragments, moist - hard	7	9-10.5	SS	19-23-34	18"
			8	10.5-12	SS	17-24-36	18"
			9	12-13.5	SS	19-27-37	18"
			10	13.5-15	SS	18-26-35	18"
			11	15-16.5	SS	19-28-37	18"
			12	16.5-18	SS	18-29-39	18"
			13	18-19.5	SS	19-30-42	18"
			14	19.5-21	SS	20-34-30	18"
860.5	21.0'		15	21-22.5	SS	7-7-12	18"
	4.5'	Mottled brown and gray silty clay, moist - stiff to very stiff	16	22.5-24	SS	5-6-12	18"
			17	24-25.5	SS	9-14-14	18"
850.0	25.5'						

Respectfully submitted,

THE H. C. NUTTING CO.

[Signature]

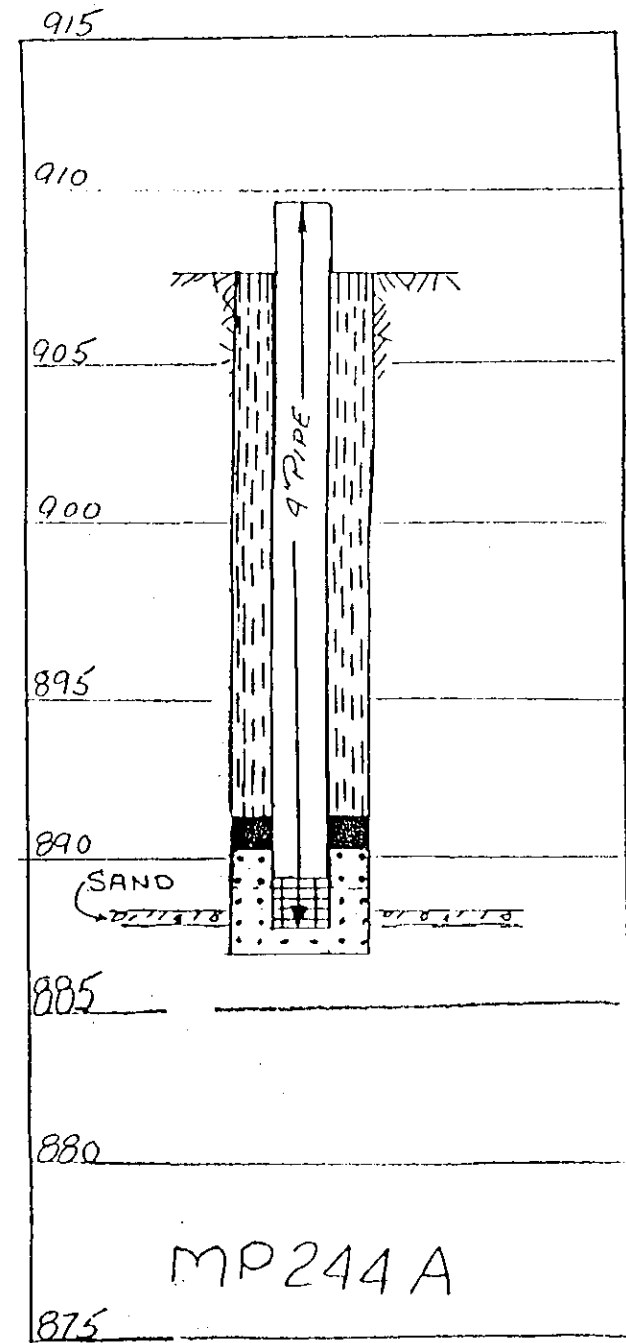
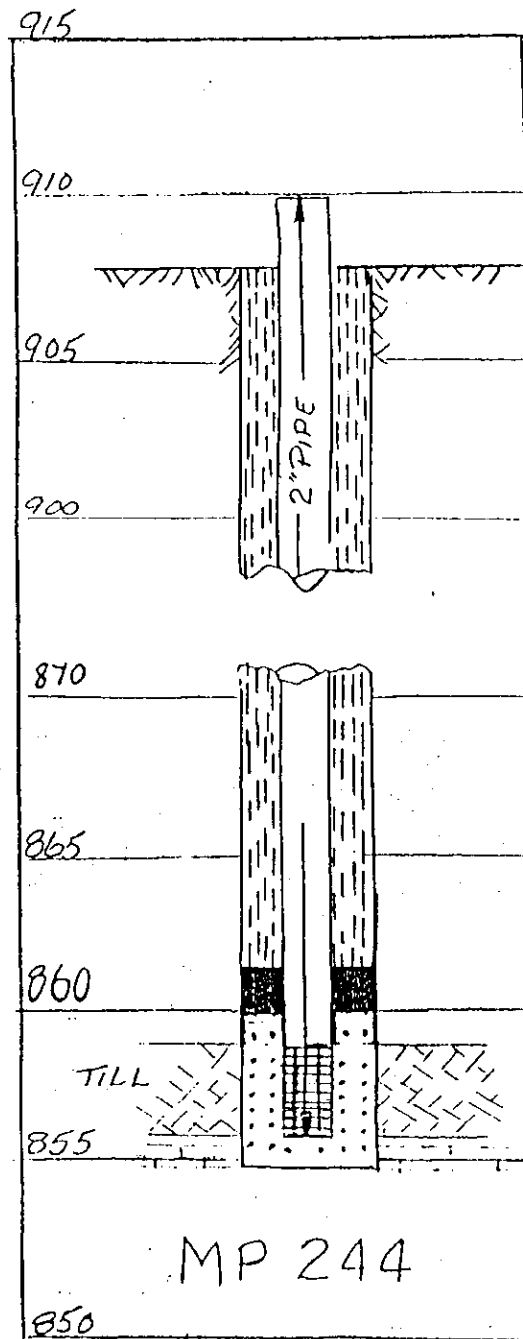
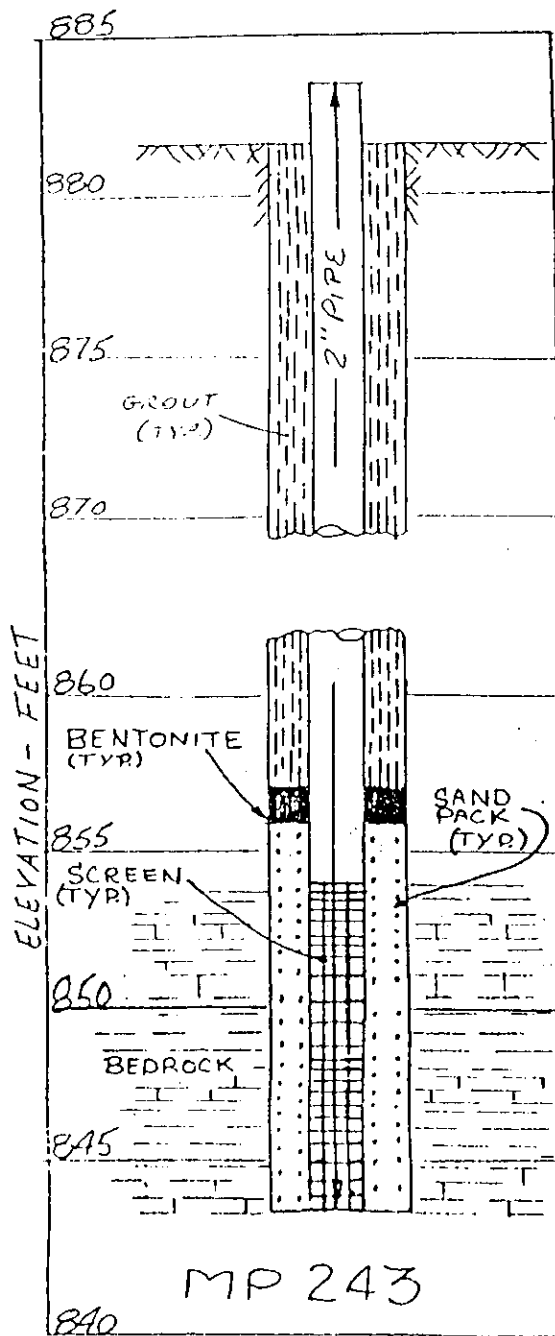
Samples recovered from this test boring are available for inspection, which is strongly recommended. The company assumes no responsibility for interpretation.

6-5-84 vf

Page 2 of 2

OBJECT Installation of Monitoring Wells, Aber Road Facility. HOLE No. MP243
 Clermont County, Ohio

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
856.0	25.5'						
		1.5' Brown silty sandy clay with gravel, moist - stiff	18	25.5-27	SS	14-14-15	18"
854.5	27.0'	0.8' Gray shale	19	27-27.8	SS	15-refusal	19"
853.7	27.8'	10.0' Gray shale and limestone	20	27.5-37.8	Core		80%
843.7	37.8'	Set 10' (2") well screen 37.9'-27.8' Set 12' sand pack 37.8'-25.8' Set 1' Bentonite seal 25.8'-24.8' Grouted from 24.8' - 0' 2' stick up Used 39.8' (2") PVC screen and pipe					



GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

Page 1 of 2

WB NO: 321-136

BOREHOLE: MP-244ARR

Well : Replacement Well

LOCATION: N: 4856.01 E: 5809.68

WELL CONTRACTOR: Penn Drill

RIG TYPE: Acker AD-2 HSA

WELL GEOLOGIST: David Silbaugh

DRILLER: Earl Dye

DATE START: 4 /26/89

DATE FINISH: 4 /28/89

GRADE ELEVATION: 908.5

TOTAL DEPTH: 28.0 ft

CASING TYPE: 316 Stainless Steel

SCREEN TYPE: 316 Stainless Steel

SCREENED INTERVAL: 20-25 ft

GROUND WATER DATA

DATE	TIME	DEPTH	REMARKS	TYPE	CASING	CORE	SAMPLER	TUBE
8/04/89	1358	16.48	Before Develop.	DIAMETER			SS	
/ /				HAMMER			300 lbs	
/ /				FALL			30in.	

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
0-10				0-10 feet augered without sampling, see MP-244 for lithologic description.		
11	S-1	3 8 15 14	24	GLACIAL TILL: brown: mostly silt and clay, few gravel, trace fine to coarse sand and rock fragments: hard: dry to moist.		
12		7 14		12.8-13.0 brown silty sand, dry to moist.		
13	S-2	28 21	24	SAND: brown: mostly fine to medium sand, 13.3 some silt, trace gravel: dense: dry to moist.	Auger cuttings are moist.	
14		11 17		14.1		
15	S-3	18 18	24	GLACIAL TILL: brown, color change to gray at 14.8 ft.: mostly silt and clay, few gravel, trace fine to coarse sand and rock fragments: hard: dry to moist.		

REMARKS: Replacement well for MP-244AR which had a pH of greater than 71 (grout contaminated). TOC Elevation (measuring reference point) 909.83 ft. (5/10/89)

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

Page 2 of 2

321-136

BOREHOLE: MP-244ARR

CT: Replacement Well

LOCATION: N: 4856.01 E: 5809.68

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
5		8		GLACIAL TILL, continued		
		9				
7	S-4	9	24			
		19				
8		5				
		8				
9	S-5	11	24			
		12				
0		6				
		9				
	S-6	12	24			
		17			21.3	
2		7			SILT: most silt: very dense: moist: well sorted, homogeneous.	
		17				
3	S-7	15	24			
		20				
4		8				
		10			Bottom contact is wet.	24.5
5	S-8	27	24		GLACIAL TILL: gray: as above.	
		54				
6				Sampled to 26 ft., augered to 28ft.		
8						

REMARKS:

May 1986

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

Water Level

1 hr.

Casing Hammer Wt.	340	lbs.	Drop	20
-------------------	-----	------	------	----

Sampler Hammer Wt. 140 lbs. Drop 30

Sampler Size 2 in O.D. Casing Size 8

Hole No.

For

244-B Surface Elevation

Sheet 1 of 2

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Location

Started 11/2/85

Completed 11/5/85

Job No. 85147-1

ELEVATION	DEPTH 0.0	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/6" Penetration on Sampler
			42.0' 8" Auger - No Sampling				
	42.0		8.0' Dense, Dark Gray Clayey Sandy Silt with Rock Fragments, Damp Pressure Tested to 53.3'			42.7	32-50/.2'
	50.0					47.9	58-60/.4'

May 1986

PITTSBURGH, PA. 15220

Water Level

1 hr.	24 hrs.
100	100
90	90
80	80
70	70
60	60
50	50
40	40
30	30
20	20
10	10
0	0

Casing Hammer W/L	lbs. Drop	in.
100	10	1.0
200	20	2.0
300	30	3.0
400	40	4.0
500	50	5.0
600	60	6.0
700	70	7.0
800	80	8.0
900	90	9.0
1000	100	10.0

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Sampler Size 2 in O.D. Casing Size 8 in.

Hole No. 244-B

For

Surface
Elevation

Sheet 2 of 2

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Completed

Job No. 85147-1

[illegible]

SOIL BORING LOG

PAGE 1 OF 3
DATE 6-1-85PROJECT NAME: ADAMS ROAD
BORING NUMBER: MP-246
COORDINATES: _____PROJECT NUMBER: _____
APPROX. ELEV.: -90.6
DRILLER: SAME FINLEY MOORE

CASING INFORMATION				GROUNDWATER LEVEL DATA T.O.C.			
SIZE	DEPTH	DATE	TIME	DEPTH	DATE	TIME	DEPTH
3.25 HS	15.50	6-2-85	0800	14.1			
		6-28-85	1000	12.7			

DRILLING METHOD HS AUGERS

DEPTH (FT)	BLOWS ON SAMPLER PER 6 INCHES	SAMPLE RECOVERY (INCHES)	SAMPLE NUMBER AND TYPE	SOIL DESCRIPTION	VOLATILE READING HNU/OVA	DRILLING OBSERVATIONS
0						USCS
1.5	3 4	18	S-1	MOTTLED BROWN/GRAY MEDIUM STIFF TO STIFF SILTY CLAY		CL TRACE OF ROOTS AND TWIGS SOIL IS DAMP TO MOIST
5.5						
6.5	4 5 7	18	S-2	TAN/BROWN MEDIUM STIFF TO STIFF SILTY CLAY - TRACE OF GRAY ROOTS		
10.0						
11.5	14 5 90	18	S-3	BROWN/GRAY VERY HARD SILTY CLAY - TRACE OF COARSE SAND & FINE GRAVEL		MATERIAL IS DR. TO DAMP

GENERAL COMMENTS: NOTE: ALL TERRAIN W/ 3.25" ID. HS AUGER

DRILLING SUPERVISED BY J.W. ONEACE

SOIL BORING LOG

 PAGE 2 OF 3
 DATE 6-1-75

 PROJECT NAME: 4 BEL ROAD PROJECT NUMBER: _____
 BORING NUMBER: MP-246 APPROX. ELEV.: _____
 COORDINATES: _____ DRILLER: _____

CASINGS INFORMATION		GROUNDWATER LEVEL DATA					
SIZE	DEPTH	DATE	TIME	DEPTH	DATE	TIME	DEPTH

DRILLING METHOD _____

DEPTH (FT)	BLOWS ON SAMPLER PER 6 INCHES	SAMPLE RECOVERY (INCHES)	SAMPLE NUMBER AND TYPE	SOIL DESCRIPTION	VOLATILE READING HNU/OYA	DRILLING OBSERVATIONS
12.0						
15.0						
16.5	10 30 34	18	S-4	HARD GRAY SILTY CLAY TILL - TRACE OF FINE GRAVEL		CL MATERIAL IS DRY TO DAMP
20.0						
21.5	19 26 29		S-5	DENSE GRAY FINE TO COARSE SAND - SOME SILT - TRACE OF CLAY		SP SAND IS SATURATED PH 6-8 (PAPER)
25.0				HARD GRAY SILTY CLAY		CL

GENERAL COMMENTS

PAGE 2 OF 3
DATE 6-1-85

PROJECT NAME: MP-246 PROJECT NUMBER: _____
BORING NUMBER: _____ APPROX. ELEV.: _____
COORDINATES: _____ DRILLER: _____

[illegible]

DRILLING METHOD _____

DEPTH (FT)	BLOWS ON SAMPLER PER 6 INCHES	SAMPLE RECOVERY (INCHES)	SAMPLE NUMBER AND TYPE	SOIL DESCRIPTION	VOLATILE READING HNH/OVA	DRILLING OBSERVATIONS
25.0	16			HARD GRAY SILTY CLAY - TRACE OF FINE GRAVEL	CL	
26.5	35					
27.0				BOTTOM OF BORING AT 26.5' CLEANED OUT BORING TO 27' SET 5' OF 2" 20 SLOT PVC SCREEN FROM 17'-22'		
GENERAL COMMENTS						

TEST BORING RECORD

PENNSYLVANIA DRILLING COMPANY

PITTSBURGH, PA. 15220

Driller Peter E. Martin

Hole No. 248
ForSurface
Elevation

Sheet 1 of 2

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Water Level
1 hr. 24 hrs.
Casing Hammer Wt. lbs. Drop in.
Sampler Hammer Wt. 140 lbs. Drop 30 in.
Sampler Size 2 in O.D. Casing Size 8 in.

Location

Started 10/24/85

Completed 10/31/85

Job No. 85147-1

ELEVATION	DEPTH	Casing Ham- mer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/6" Penetration on Sampler
	0.0						
			11.5' Stiff Brown Clay with Rock Fragments, Damp			1.5	2-4-8
						6.5	5-9-10
	11.5					11.5	3-8-17
			5.0' Gray Glacial Till, Stiff, Dry (Silty Clay with Rock Fragments)				
	16.5					16.5	11-18-18
			5.0' Gray Glacial Till, Stiff, Dry, Gray Sand with Rock Fragments at Bottom of Sample, Damp				
	21.5					21.5	19-20-35
			5.0' Gray Glacial Till, Stiff, Dry, Rock Fragments				
	26.5					26.5	19-28-38
			14.2' Gray Glacial Till, Very Stiff, Dry, Rock Fragments				
						30.5	90/.5'
						35.6	58-50/.1'
	40.7					40.7	28-50/.2'
			2.0' Soft Silty Clay, Gray, Very Damp				
	42.7					42.7	45-50/.2'
			8.2' Glacial Till with Rock Fragments, Gray, Very stiff, Dry				
						45.8	28-50/.3'
	50.0		(Continued)				

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

TEST BORING RECORD

Driller Peter E. Martin

Hole No. 248

Surface
Elevation

Sheet 2 of 2

Water Level

For

Browning-Ferris Industries, Inc.

1 hr. 24 hrs.

CECOS Aber Road Facility

Casing Hammer Wt. lbs. Drop 30 in.

Location

Williamsburg, Ohio

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Started

Completed

Job No. 85147-1

Sampler Size 2 in O.D. Casing Size 8 in.

ELEVATION	DEPTH	Casing Ham- mer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/6" Penetration on Sample
	50.0					50.9	25-50/.4'
	50.9		(Contd)				
			10.6' Gray Glacial Till with Rock Fragments, Medium Stiff, Dry			56.5	15-37-60
	61.5					61.5	16-32-60
			5.0' Gray Glacial Till with Rock Fragments, Medium Stiff, Dry, Gray Claystone at Bottom				
	66.5				Core Rec.	66.5	18-30-80
			20.0' Hard, Broken Limestone with Clay Seams, Gray				
					100%	76.5	
	86.5				100%	86.5	

MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 248

DATE COMPLETED 10/31/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE

HEIGHT OF RISER PIPE
ABOVE GROUND SURFACE 2.0'

SURFACE

SURFACE

GROUT FROM 66.0' TO
TOP OF HOLE

AMOUNT OF 4"
STAINLESS STEEL
RISER PIPE 74.0'

66.0' DEPTH OF TOP OF
BENTONITE

DEPTH TO TOP
OF 4" STAINLESS
STEEL SCREEN 72.0'

68.0 DEPTH OF TOP OF
SAND PACK

DEPTH TO BOTTOM
OF 4" STAINLESS
STEEL SCREEN 77.0'

TOTAL DEPTH OF BOREHOLE 86.5'

Field Number MP-248B
May 1986

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

TEST BORING RECORD

Driller Peter E. Martin
Water Level

Hole No. 248-B Surface Elevation Sheet 1 of 1
For Browning-Ferris Industries, Inc.
CECOS Aber Road Facility
Location Williamsburg, Ohio
Started 11/3/85 Completed 11/4/85 Job No. 85147-1

1 hr. 24 hrs.
Casing Hammer Wt. lbs. Drop in.
Sampler Hammer Wt. 140 lbs. Drop 30 in.
Sampler Size 2 in O.D. Casing Size in.

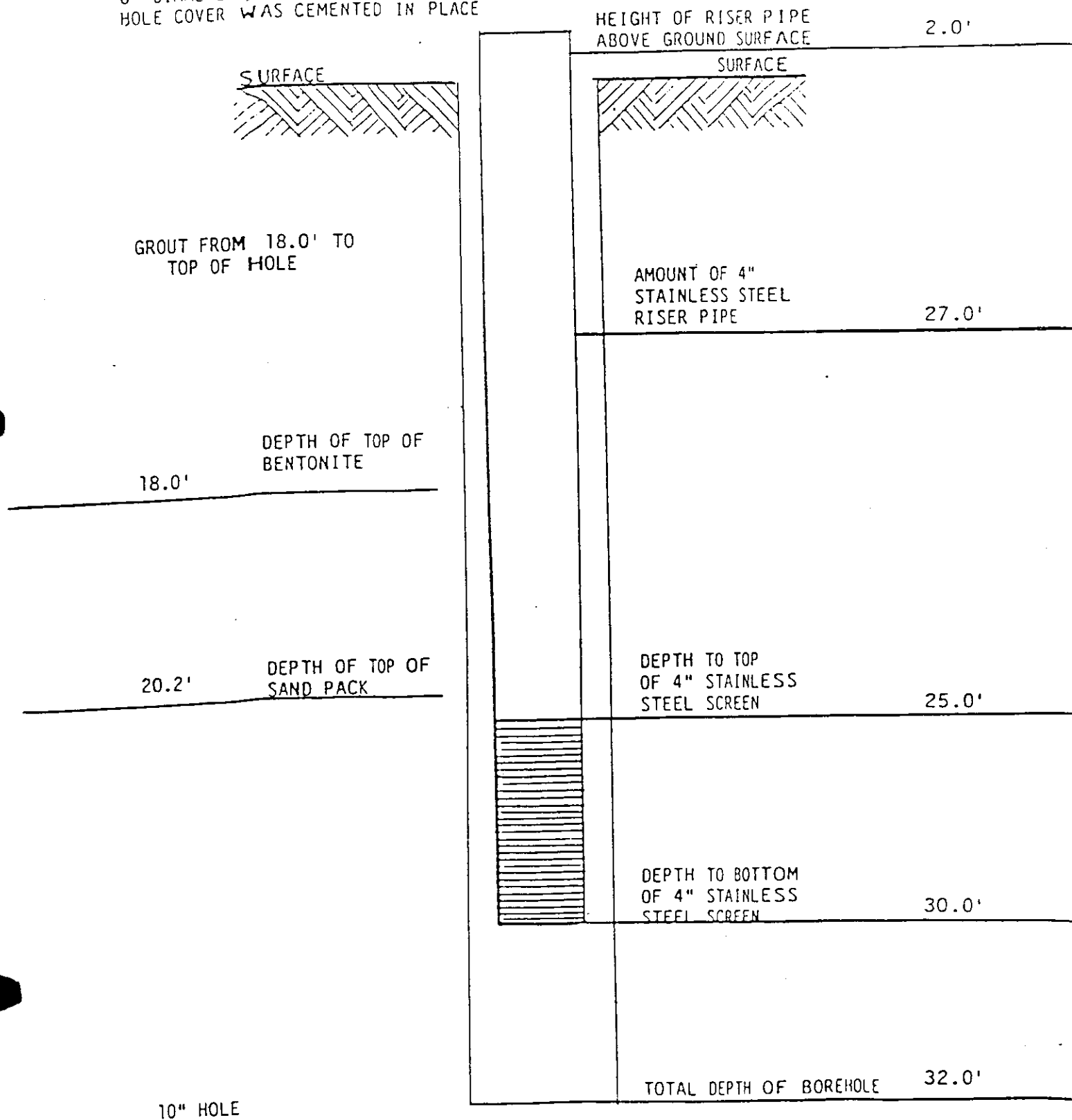
DEPTH	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/6" Penetration on Sampler
0.0						
20.0		20.0' 10" Auger - No Sampling				
21.5		1.5' Brown Sandy Clay, Firm, Dry			21.5	32-35-42
26.4		4.9' Brown Sandy Clay, Soft, Wet				
32.0		5.6' Brown Sandy Clay, Stiff, Damp			26.4	36-45-50/.4
		10" Hole to 32.0'			30.4	50/.4'

MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 248-B

DATE COMPLETED 11/4/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE



Field Number MP-249
May 1986

TEST BORING RECORD

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

Driller William J. Saccani

Water Level

1 hr.	24 hrs.
-------	---------

Casing Hammer Wt.	340	lbs.	Drop	30	in.
-------------------	-----	------	------	----	-----

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Sampler Size 2 in O.D. Casing Size 8 in.

Hole No. 249

for

Surface
Elevation

Sheet 1 of 2

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Location

Started 10/23/85

Completed 10/30/85

Job No. 85147-1

[illegible]

TEST BORING RECORD

Sheet 2 of 2

CECOS Aber Road Facility

Williamsburg, Ohio

Completed

Job No. 85147-1

Hole No. 249

Water Level

For

1 hr.	24 hrs.
100	100
90	90
80	80
70	70
60	60
50	50
40	40
30	30
20	20
10	10
0	0

Casing Hammer Wt.	lbs	Drop
-------------------	-----	------

in.

Location

Sampler Hammer Wt. 140 lbs. Drop 30

iv.

Started

Sampler Size 2 in O.D. Casing Size

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[illegible]

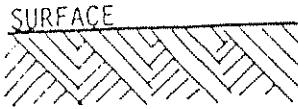
MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 249

DATE COMPLETED 10/30/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE

HEIGHT OF RISER PIPE
ABOVE GROUND SURFACE 2.0'



GROUT FROM 55.0' TO
TOP OF HOLE

55.0' DEPTH OF TOP OF
BENTONITE

57.0' DEPTH OF TOP OF
SAND PACK

HEIGHT OF RISER PIPE
ABOVE GROUND SURFACE

2.0'

AMOUNT OF 4"
STAINLESS STEEL
RISER PIPE

63.0'

DEPTH TO TOP
OF 4" STAINLESS
STEEL SCREEN

61.0'

DEPTH TO BOTTOM
OF 4" STAINLESS
STEEL SCREEN

66.0'

REAMED HOLE TO 6"

TOTAL DEPTH OF BOREHOLE 66.0'

Field Number MP-249B
May 1986

TEST BORING RECORD

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

Driller William J. Saccani

Water Level

1 hr.	24 hrs.
100	100
90	90
80	80
70	70
60	60
50	50
40	40
30	30
20	20
10	10
0	0

Casing Hammer Wt.	lbs.	Drop	in.
	140	20	

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Sampler Size 2 in O.D. Casing Size in.

Hole No. 249-8 Surface
Elevation
For Browning-F

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Started: 11/22/85 Completed: 11/22/85 Job No. 85147-1

Completed 11/22/85

Job No. 85147-1

[illegible]

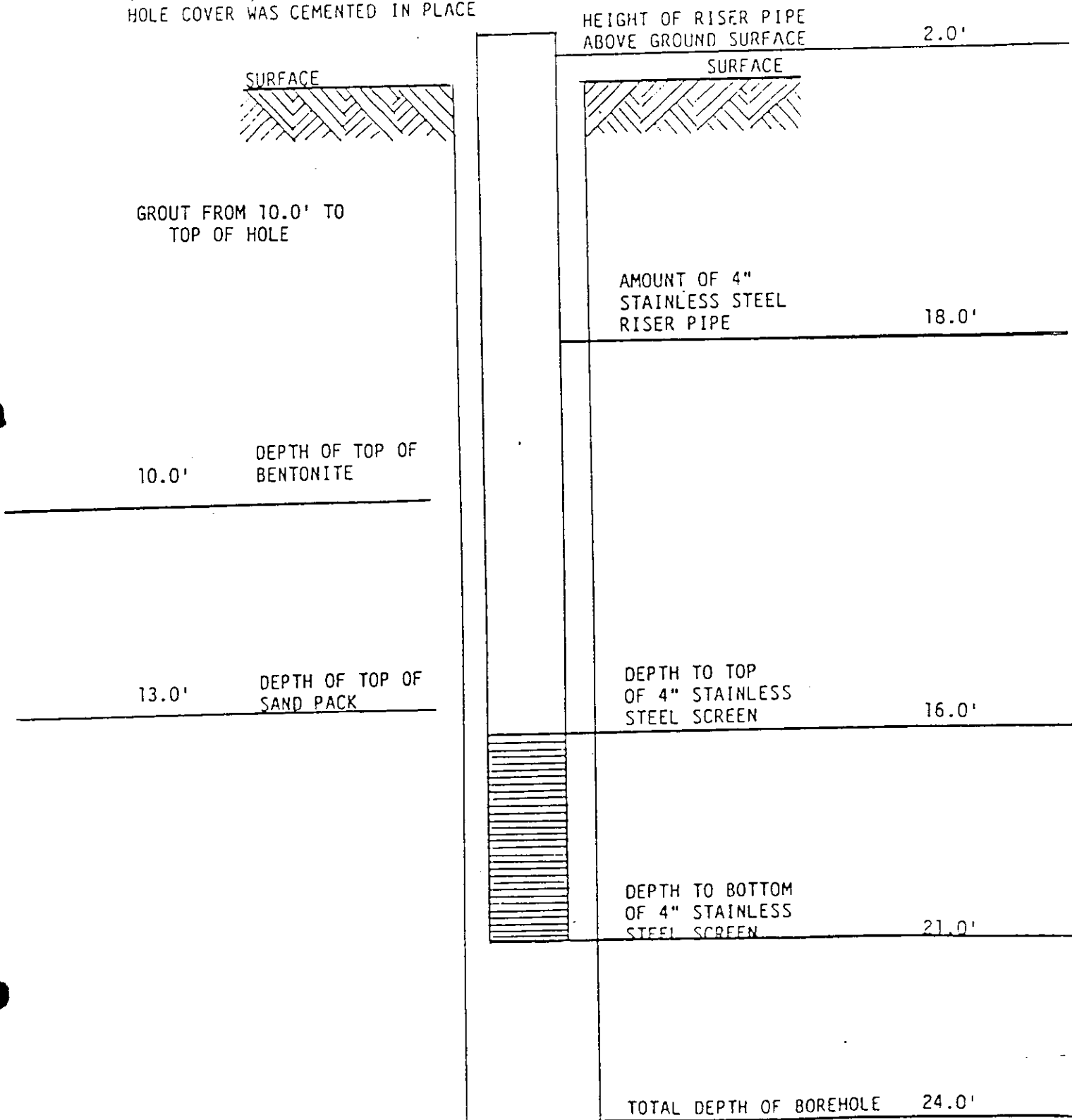
Field Number MP-2498
May 1986

MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 249-B

DATE COMPLETED 11/22/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE



Field Number MP-250

May 1986

PENNSYLVANIA DRILLING COMPANY

PITTSBURGH, PA. 15220

TEST BORING RECORD

Driller William J. Saccani

Hole No. 250

Surface Elevation *est 905.5 (7)*

Sheet 1 of 2

Water Level

For

Browning-Ferris Industries, Inc.

1 hr. 24 hrs.

CECOS Aber Road Facility

Casing Hammer Wt. lbs. Drop

Location

Williamsburg, Ohio

Sampler Hammer Wt. 140 lbs. Drop 30

Started 11/23/85

Completed 11/24/85

Job No. 85147-1

Sampler Size 2 in O.D. Casing Size 8

in.

ELEVATION	DEPTH	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/6" Penetration on Sampler
	0.0						
			10.0' Augered - No Sampling				
			Dry				
	10.0						
			23.0' Brown to Dark Gray Sandy Silt with Rock Fragments; Dense to Very Dense, Dry			11.5	4-6-20
						16.5	12-22-25
						21.0	40-50-50/
						25.5	63/.5'
						31.0	25-50-50
	33.0		3.2' Coarse Dark Gray Sand, Loose, Wet				
	36.2		17.8' Dark Gray Clayey Silt with Rock Fragments, Very Dense, Dry			36.5	2-5-48
						41.0	52-61-50
						46.0	40-66-50
	50.0						

(Continued)

Field Number MP-250
May 1986

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

Per William J. Saccani

Water Level

1 hr.	24 hrs.
100	100
90	90
80	80
70	70
60	60
50	50
40	40
30	30
20	20
10	10
0	0

Casing Hammer Wt.	lbs.	Drop
310		

Sampler Hammer Wt. 140 lbs. Drop 30

Sampler Size 2 in O.D. Casing Size 8 in.

Hole No. 250

for

Location

Started

Surface
Elevation

Sheet 2 of 2

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Completed

Job No. 85147-1

TEST BORING RECORD

[illegible]

May 1986

PITTSBURGH, PA. 15220

TEST BORING RECORD

der William J. Saccani

Hole No. 250-A

Surface
Elevation

Sheet 1 of 1

water Level

1 hr. 24 hrs.

Casing Hammer Wt.	lbs.	Drop
-------------------	------	------

Sampler Hammer Wt. 140 lbs. Drop 30

Sampler Size 2 in O.D. Casing Size 8 in.

Location

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Started 11/25/85

Completed 11/26/85

Job No. 85147-1

[illegible]

Field Number MP-251
May 1986

TEST BORING RECORD

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

Driller James McCann

Water Level

1 hr.	1.9	24 hrs.	12.9
-------	-----	---------	------

Casing Hammer Wt.	lbs.	Drop	in.
-------------------	------	------	-----

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Sampler Size 2 in O.D. Casing Size 8 in.

Hole No. 251

For

Surface
Elevation

Sheet 1 of 2

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Location

Started 10/21/85

Completed 10/25/85

Job No. 85147-1

ELEVATION	DEPTH	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/6" Penetration on Sampler
	0.0						
	8.0		8.0' Stiff Brown Silty Clay with Fine Sand, Damp				
	12.0		4.0' Brown Silty Clay, Stiff, Damp				
	32.0		20.0' Very Stiff Gray Silty Clay with Small Gravels - Till				
	36.0		4.0' Soft Gray Silt with Sand & Gravel, Very Wet				
	50.0		29.0' Very Stiff Gray Silty Clay with Small Gravel, Damp				
			(Continued)				

Field Number MP-251
May 1986

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

TEST BORING RECORD

Driller James McCann

Hole No. 251

Surface
Elevation

Sheet 2 of 2

Water Level

For

Browning-Ferris Industries, Inc.

1 hr. 24 hrs.

CECOS Aber Road Facility

Casing Hammer Wt. lbs. Drop in.

Location

Williamsburg, Ohio

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Started

Completed

Job No. 85147-1

Sampler Size 2 in O.D. Casing Size 8 in.

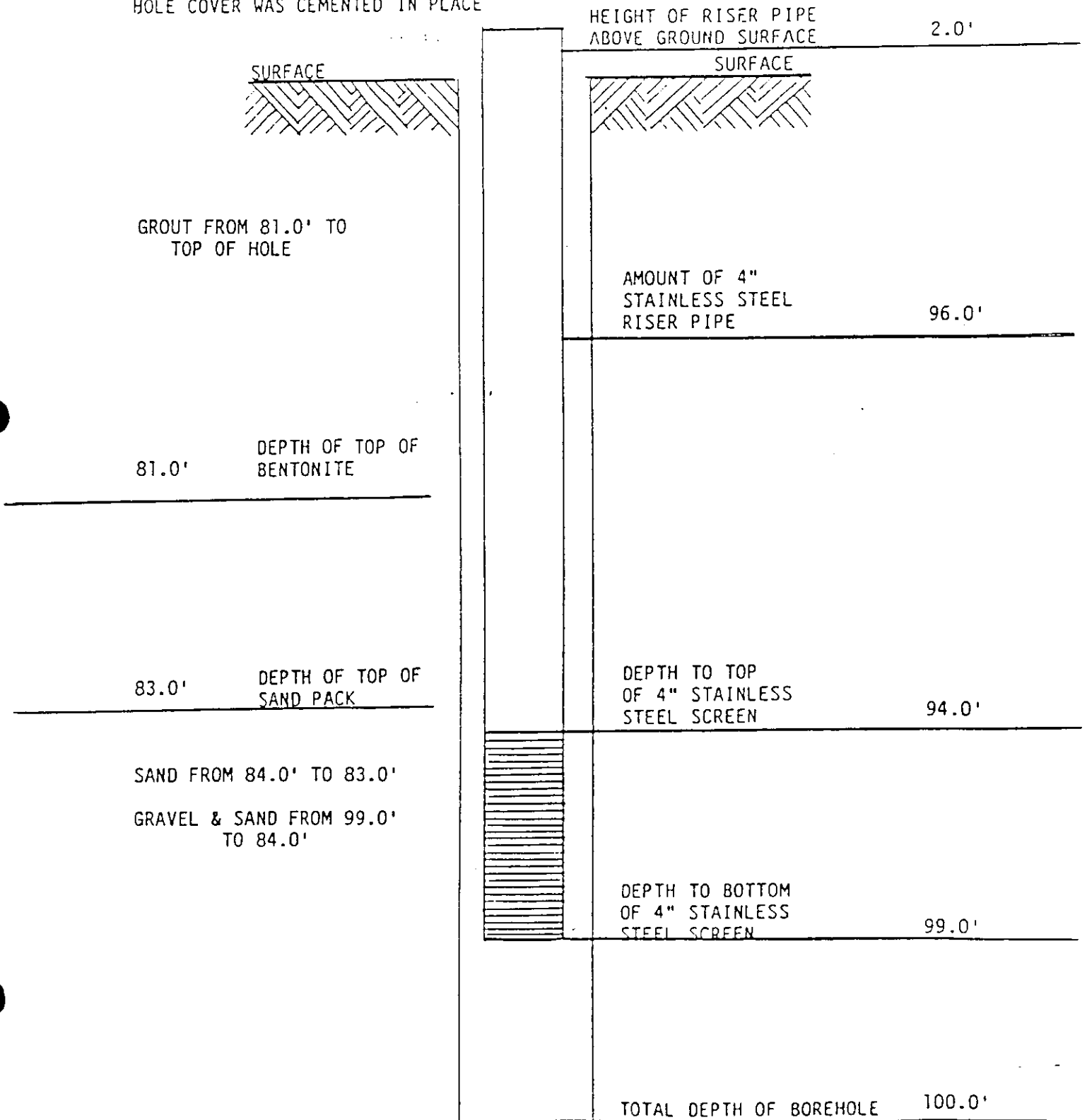
ELEVATION	DEPTH	Casing Hammer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/6" Penetration on Sampler
	50.0		(Contd)				
			Very Stiff Gray Silty Clay with Small Gravel, Damp				
	65.0		10.0' Soft Gray Silt with Layer of Sand, Damp				
	75.0		5.0' Weathered Gray Clayey Shale				
	80.0		20.0' Medium Hard Gray Sandstone with Gray Clay Seams & Limestone Seams		Core Rec.	80.0	
					100%	85.0	
					100%	90.0	
					6" Hole to	100.0'	
			Field notes suggest "Limestone Seams may start at 94'				
	100.0						
						100.0	

MONITORING WELL INSTALLATION REPORT
CECOS ABER ROAD FACILITY
WILLIAMSBURG, OHIO

WELL NO. 251

DATE COMPLETED 10/25/85

6" DIAMETER, 5.0' LONG LOCKABLE
HOLE COVER WAS CEMENTED IN PLACE



Field Number MP-251A

May 1986

PENNSYLVANIA DRILLING COMPANY

TEST BORING RECORD

PITTSBURGH, PA. 15220

Driller James McCann

Hole No. 251-A

Surface
Elevation

Sheet 1 of 2

Water Level

For

Browning-Ferris Industries, Inc.

1 hr. 11.9 24 hrs.

CECOS Aber Road Facility

Casing Hammer Wt. lbs. Drop in.

Location

Williamsburg, Ohio

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Started 10/25/85

Completed

10/28/85

Job No. 85147-1

Sampler Size 2 in O.D. Casing Size 8 in.

ELEVATION	DEPTH	Casing Ham- mer Blows	Driller's Log <input checked="" type="checkbox"/>	Geologist's Log <input type="checkbox"/> Mechanical Analysis <input type="checkbox"/>	Remarks	Sample Depth	Blows/6" Penetration on Sampler
	0.0						
			5.0' Stiff Brown Silt with Gravel, Damp			1.5	3-5-6
	5.0						
			3.0' Stiff Gray Silty Clay, Damp			6.5	2-3-4
	8.0						
			22.0' Very Stiff Gray Silty Clay with Small Gravel, Damp - Till			11.5	1-24-50
						16.5	24-27-32
						21.2	36-50-100
							.2
						26.5	37-39-47
	30.0						
			6.0' Soft Gray Silt with Sand & Gravel, Very Wet			31.5	22-40-49
	36.0					36.5	15-17-30
			32.0' Very Stiff Gray Silt with Gravel, Some Fine Sand, Damp			41.3	23-56-100
							.3
						46.1	25-50-10
	50.0		(Continued)				

Field Number MP-251A
May 1986

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA. 15220

TEST BORING RECORD

Miller James McCann

Hole No. 251-A

Surface
Elevation

Sheet 2 of 2

Browning-Ferris Industries, Inc.

CECOS Aber Road Facility

Williamsburg, Ohio

Completed

Job No. 85147-1

der Level

1 hr.	24 hrs.
-------	---------

Casing Hammer Wt.	lbs	Drop	in.
-------------------	-----	------	-----

Sampler Hammer Wt. 140 lbs. Drop 30 in.

Sampler Size 2 in O.D. Casing Size 8 in.

Location

Started

in.

[illegible]

WARZYN**ENGINEERING INC****LOG OF TEST BORING**

Project Groundwater Assessment Program
 Aber Road Facility-Cecos International
 Location Williamsburg, Ohio
 N4353, E6267

Boring No. MP252
 Surface Elevation 893.5
 Job No. 600055
 Sheet 1 of 2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery		Moisture		N	Depth		q _u	W	LL	PL	D
No.	Type	↓	↓								
1	SS	18"	W	6		Soft to Medium Stiff, Brown Lean CLAY, Some Sand and Roots (CL)	(0.25)	19.7			
2	SS	18"	W	4			(1.0)	17.9			
3	SS	18"	D/M	34	5	Hard, Brown & Gray Mottled Lean CLAY, Trace Sand & Gravel (CL)	(4.5+)	7.6			
4	SS	24"	D/W	75		Hard, Brown SILT, Some Clay (ML)	(4.5+)	18.3			
5	SS	24"	D/M	73	10	Hard, Brown & Gray Mottled Lean CLAY, Little Sand & Gravel (CL)	(4.5+)	5.7			
6	SS	24"	M	116		Very Dense, Brown Silty Clayey SAND (SC-SM)	(4.5+)	12.6			
7	SS	21"	W	68			(4.5+)	17.6			
8	SS	18"	D/M	74	15	Hard, Gray Silty CLAY, Trace Sand (CL-ML) Medium to Coarse Sand Lense 15.0-15.8' Grades with Some Sand and Trace to Little Gravel near 17'	(4.5+)	8.1			
	SS	24"	D/M	138			(4.5+)	8.5	15	11	
10	SS	22"	D/M	80	20		(4.5+)	7.7			
11	SS	24"	D/M	75			(4.5+)	7.7	22	14	
12	SS	21"	D/M	73			(4.5+)	7.6			
13	SS	23"	D/M	66	25		(4.5+)	7.7			
14	SS	24"	D/M	69			(4.5+)	8.9			
15	SS	24"	D/M	64	30		(4.5+)	7.9			
16	B"SS	24"	D/M	110	35		(4.5+)	8.6	22	14	
17	SS	24"	D/M	53	40		(4.5+)	7.0			
							()	Pocket Penetrometer Reading, TSF			
18	SS		D/M	99	45	Fine to Coarse Sand Lense 45.0-45.8'	(4.5+)	6.1			

(Continued)

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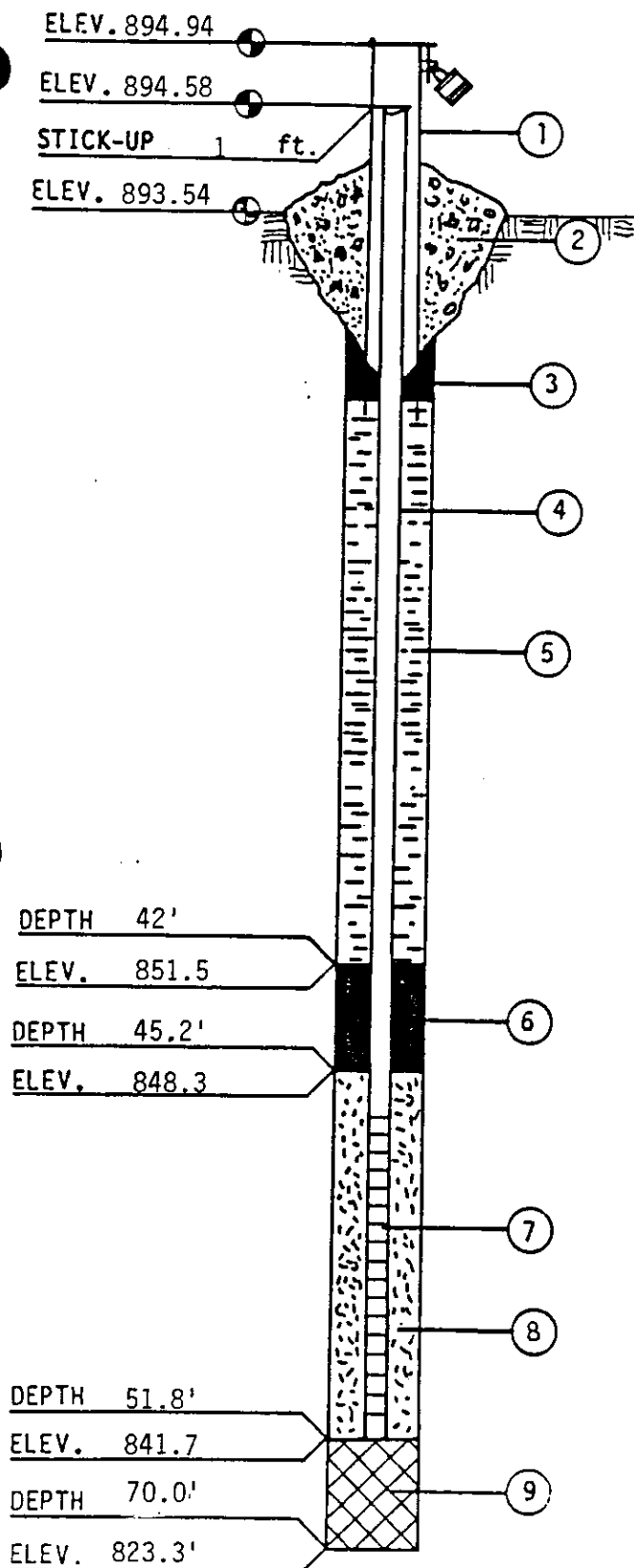
LOG OF TEST BORING

Project Groundwater Assessment Program
Aber Road Facility-Cecos International
Location Williamsburg, Ohio
N4353, E6267

Boring No. MP252
Surface Elevation 893.5
Job No. 600055
Sheet 2 of 2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

[illegible]



*51.8-52.8': Sand
 52.8-53.8': Bent. Pellets
 53.8-70.0': Drill Cuttings
 & Slough

MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 600055

BORING/WELL NO. MP 252

DATE 3/31/86 - 4/4/86

CHIEF/UNIT SW/9200

1. PROTECTIVE CASING ☒ YES NO
 LOCKING ☒ YES NO
2. CONCRETE SEAL ☒ YES NO
3. TYPE OF SURFACE SEAL (IF INSTALLED)

4. SOLID PIPE TYPE Sch. 40 PVC
 SOLID PIPE LENGTH 52.5 ft.
 JOINT TYPE SLIP/GLUED ☒ THREADED

5. TYPE OF BACKFILL 7% Bentonite-Cement Grout
 HOW INSTALLED - ☒ TREMIE
FROM SURFACE

6. TYPE OF LOWER SEAL (IF INSTALLED)
Bentonite Slurry

7. SCREEN TYPE Sch. 40 PVC
 SCREEN LENGTH 5.0'
 SLOT-SIZE 0.010' LENGTH 4.0 ft.
 SCREEN DIAMETER 4.0 in.

8. TYPE OF BACKFILL AROUND SCREEN
Ottawa Silica Filter Sand

9. TYPE OF BACKFILL *

10. DRILLING METHOD HSA: 0-41.5', RWB 41.5-56.5
Rock Core 56.5-70.0'

11. ADDITIVES USED (IF ANY)
(Clear Water)

WATER LEVEL DATE

*ALL DEPTHS MEASURED FROM GROUND SURFACE.





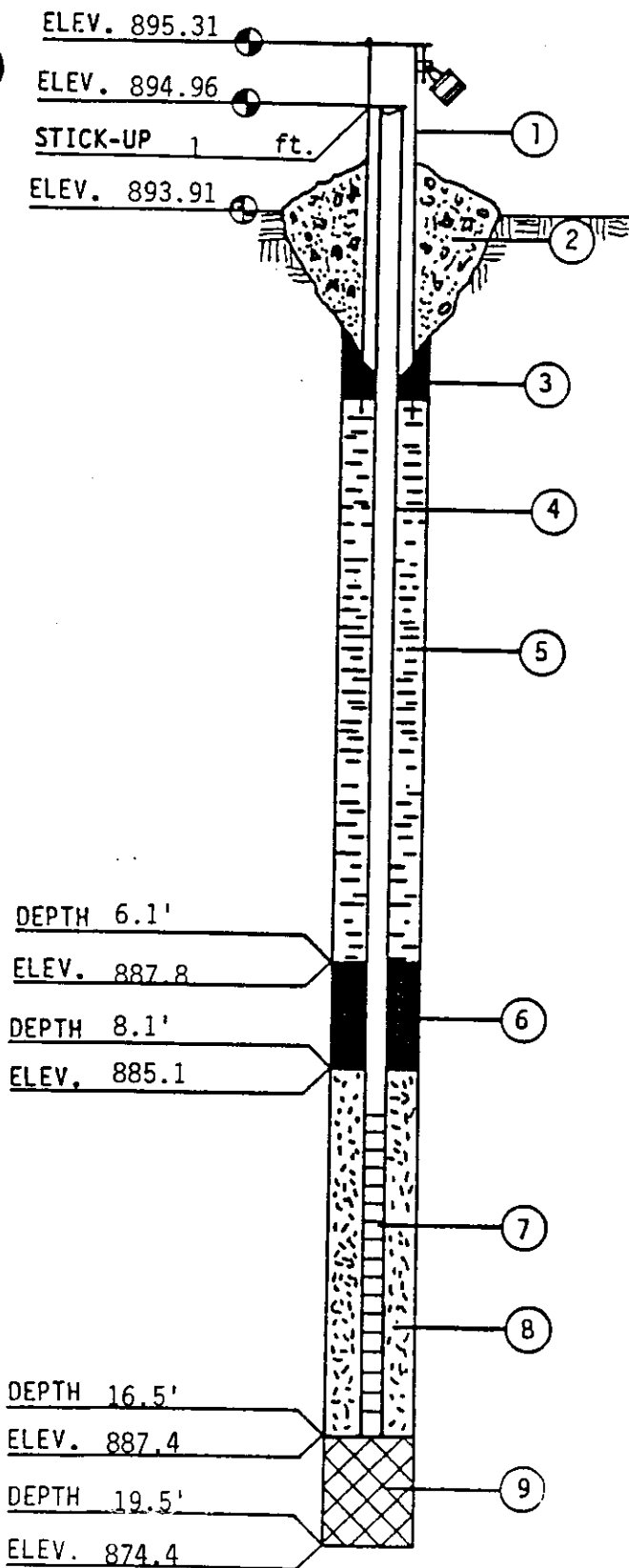
LOG OF TEST BORING

Groundwater Assessment Program
Project
Aber Road Facility-Cecos International
Location
Williamsburg, Ohio
N4357, E6268

Boring No. _____ MP252A
Surface Elevation 893.9
Job No. 600055
Sheet 1 of 1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				Qu	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
					0-19.5'	Blind Drill See log of MP252 for detailed soil classification					
					5						
					10	SOIL					
					15						
					20	End Boring at 19.5' on 4/1/86					
					25						
					30	Installed groundwater monitoring well. See separate detail sheet.					
					35						
					40						
WATER LEVEL OBSERVATIONS							GENERAL NOTES				
While Drilling _____							Start 4/1/86 Complete 4/1/86				
Upon Completion of Drilling _____							Crew Chief SW Rig CME 75				
Time After Drilling _____							Drilling Method 6 1/4" ID HSA				
Depth to Water _____							0-19.5'				
Depth to Cave In _____											



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 600055

BORING/WELL NO. MP252A

DATE 4/1/86

CHIEF/UNIT SW/9200

1. PROTECTIVE CASING ☒ YES NO
LOCKING ☒ YES NO
2. CONCRETE SEAL ☒ YES NO
3. TYPE OF SURFACE SEAL (IF INSTALLED)

4. SOLID PIPE TYPE Sch. 40 PVC
SOLID PIPE LENGTH 12.5' ft.
JOINT TYPE SLIP/GLUED ☒ THREADED
5. TYPE OF BACKFILL 9% Bentonite-Cement Grout
HOW INSTALLED - ☒ TREMIE FROM SURFACE
6. TYPE OF LOWER SEAL (IF INSTALLED)
Bentonite Pellets
7. SCREEN TYPE Sch. 40 PVC
SCREEN LENGTH 5.0'
SLOT-SIZE 0.010' LENGTH 4.0 ft.
SCREEN DIAMETER 4.0 in.
8. TYPE OF BACKFILL AROUND SCREEN
Ottawa Silica Filter Sand
9. TYPE OF BACKFILL 17.0-19.5': Cuttings
16.5-17.0': Sand
10. DRILLING METHOD (6 1/4" ID) HSA 0-19.5'
11. ADDITIVES USED (IF ANY)
None

WATER LEVEL _____ DATE _____

*ALL DEPTHS MEASURED FROM GROUND SURFACE.



WARZYN**ENGINEERING INC****LOG OF TEST BORING**

Project Groundwater Assessment Program
 Aber Road Facility-Cecos International
 Location Williamsburg, Ohio
 N4185, E5610

Boring No. MP253
 Surface Elevation 900.3
 Job No. 600055
 Sheet 1 of 2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				q _u	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
1	SS	24"	W	P		Very Stiff to Hard, Brown Lean CLAY to Silty CLAY, Little Sand, Trace Gravel (CL/CL-ML)	(3.5)	18.5			
2	SS	24"	W	P			(4.0)	20.8			
3	SS	20"	D/M	64	5		(4.5+)	8.5			
4	SS	22"	D/M	38			(3.5)	8.9			
5	SS	24"	D/M	76	10		(4.5+)	8.8			
6	3"SS	20"	D/M	40			*	(3.5)	8.0	20	14(combined)
7	SS	24"	D/M	37		**	(4.5+)	7.4			
8	SS	24"	D/M	65	15	Hard, Gray Silty CLAY, Some Sand, Trace Gravel (CL-ML)	(4.5)	9.0			
	SS	18"	D/M	36			(4.5+)	8.0			
10	SS	16"	D/M	17	20		(4.5+)	9.1			
11	SS	24"	D/M	142			(4.5+)	7.5			
12	SS	18"	D/M	138			(4.5+)	7.2			
13	SS	16"	D/M	104	25		(4.5+)	7.5			
14	SS	12"	D/M	125			(4.5+)	8.4			
15	SS	13"	D/M	145	30		(4.5+)	7.5			
16	SS	12"	D/M	94			(4.5+)	8.0			
17	3"SS	10"	D/M	36			(4.5+)				
18	3"SS	16"	D/M	98	35		(4.5+)	7.4	19	12	
						*Dense, Brown Fine to Coarse SAND & GRAVEL (SP/GP)					
19	SS	24"	D/M	75	40	**Very Stiff, Red to Black Silty CLAY (CL-ML)	(4.5+)	9.0			
							()	Pocket Penetrometer Reading, TSF			
20	SS	12"	D/M	51	45		(4.5)	8.5			

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WARZYN**ENGINEERING INC****LOG OF TEST BORING**

Project Groundwater Assessment Program
 Aber Road Facility-Cecos International
 Location Williamsburg, Ohio
 N4185, E5610

Boring No. MP253
 Surface Elevation 900.3
 Job No. 600055
 Sheet 2 of 2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE**VISUAL CLASSIFICATION
and Remarks****SOIL PROPERTIES**

Recovery		Moisture		N	Depth
No.	Type	↓	↓		

q _u	W	LL	PL	D
----------------	---	----	----	---

21	SS		M124		50

Hard, Gray Silty CLAY, Some Sand, Trace Gravel (CL)					
Very Dense, Gray Clayey SAND & GRAVEL (SC/GC) (Weathered Shale) 50.1'					

RUN NO.	INTERVAL (ft)	REC (%)	ROD (%)		
---------	---------------	---------	---------	--	--

1	51.0-59.0	94	33		55
---	-----------	----	----	--	----

Interbedded Gray SHALE and LIMESTONE, Horizontally Jointed, Joints Shaley, Limestone Fossiliferous near Joints, Beds Vary from 2-8"					
---	--	--	--	--	--

2	59.0-66.0	98	61		60
---	-----------	----	----	--	----

Fractures/ft.					
7					
6					
3					
4					
3					
3					
3					

20 min. 350-500 RPM					
250 PSI					

3	66.0-71.0	97	44		65
---	-----------	----	----	--	----

20 min. 350-500 RPM					
250 PSI					

15 min. 350-500 RPM					
250 PSI					

End Boring at 71.0' on 3/17/86					
--------------------------------	--	--	--	--	--

() Pocket Penetrometer Reading, TSF					
--------------------------------------	--	--	--	--	--

Ran packer test and installed groundwater monitoring well. See separate well detail sheets.					
---	--	--	--	--	--

75					
----	--	--	--	--	--

80					
----	--	--	--	--	--

85					
----	--	--	--	--	--

WATER LEVEL OBSERVATIONS**GENERAL NOTES**

While Drilling _____
 Upon Completion of Drilling _____
 Time After Drilling _____
 Depth to Water _____
 Depth to Cave In _____

3/15/86 3/17/86
 Start Complete
 Crew Chief TCR CME 75
 Drilling Method 6 1/4" ID HSA
 0-39.0'; DC 8" 0-50.1',
 DC 3" 0-51.0', 6 7/8" RB
 39.0-55'

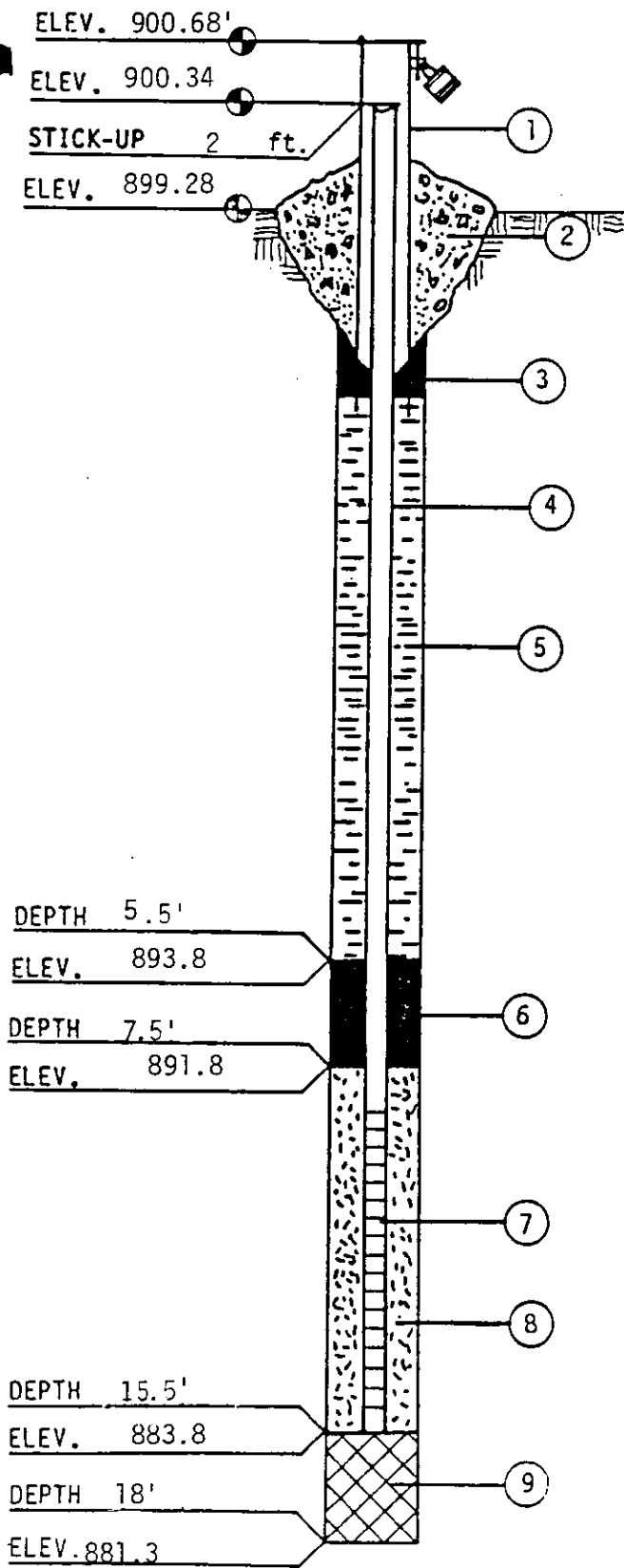
WARZYN**ENGINEERING INC****LOG OF TEST BORING**

Groundwater Assessment Program
 Project Aber Road Facility - Cecos International
 Location Williamsburg, Ohio
N4188, E5604

Boring No. MP253A
 Surface Elevation 900.3
 Job No. 600055
 Sheet 1 of 1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES					
Recovery			Moisture				q _u	W	LL	PL	D	
No.	Type	↓	↓	N	Depth							
						Blind Drill 0-18' See Log of MP253 for Detailed Soil Classification						
					5	SOIL						
					10							
					15							
					20							
					25							
					30							
					35							
					40							
							End Boring at 18' on 3/22/86					
							Installed groundwater monitoring well. See separate detail sheet.					
WATER LEVEL OBSERVATIONS						GENERAL NOTES						
While Drilling _____						Start <u>3/22/86</u> Complete <u>3/22/86</u>						
Upon Completion of Drilling _____						Crew Chief <u>SW</u> Rig <u>CME 75</u>						
Time After Drilling _____						Drilling Method <u>6 1/4" ID HSA</u>						
Depth to Water _____						0-18.0'						
Depth to Cave In _____												



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 600055

BORING/WELL NO. MP 253A

DATE 3/22/86

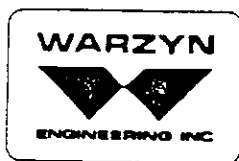
CHIEF/UNIT SW/9200

1. PROTECTIVE CASING ☒ YES NO
LOCKING ☒ YES NO
2. CONCRETE SEAL ☒ YES NO
3. TYPE OF SURFACE SEAL (IF INSTALLED)

4. SOLID PIPE TYPE Sch. 40 PVC
SOLID PIPE LENGTH 13' ft.
JOINT TYPE SLIP/GLUED ☒ THREADED
5. TYPE OF BACKFILL 6% Bentonite-Cement Grout
HOW INSTALLED - ☒ TREMIE
FROM SURFACE
6. TYPE OF LOWER SEAL (IF INSTALLED)
Bentonite Pellets
7. SCREEN TYPE Sch. 40 PVC
SCREEN LENGTH 5'
SLOT-SIZE 0.010' LENGTH 4.0 ft.
SCREEN DIAMETER 4 in.
8. TYPE OF BACKFILL AROUND SCREEN
Ottawa Silica Filter Sand
9. TYPE OF BACKFILL Sand
10. DRILLING METHOD Hollow Stem Auger
11. ADDITIVES USED (IF ANY)
None

WATER LEVEL _____ DATE _____

*ALL DEPTHS MEASURED FROM GROUND SURFACE.



WARZYN**ENGINEERING INC****LOG OF TEST BORING**

Project Groundwater Assessment Program
 Aber Road Facility-Cecos International
 Location Williamsburg, Ohio
 N3760, E5168

Boring No. MP254
 Surface Elevation 884.6
 Job No. 600055
 Sheet 1 of 2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery		Moisture		N	Depth		qu	W	LL	PL	D
No.	Type	↓	↓								
1	3"SS	24"	D/M	7	5	Stiff to Very Stiff, Brown Sandy Silty CLAY, Trace Gravel (CL-ML)	(3.25)	7.6	26	19	
2	SS	21"	W	24		Hard, Brown Sandy Lean CLAY, Trace Gravel (CL)	(1.25)	19.2			
3	3"SS	12"	D/M	118			(4.5+)	7.9	22	14	
4	3"SS	21"	D/M	72							
5	SS	18"	D/M	70			(4.5+)	8.2			
6	SS	20"	D/M	70	10		Hard, Gray Silty CLAY, Some Sand, Trace Gravel (CL-ML)		8.8		
7	SS	15"	D/M	48		(4.5+)		7.2			
8	SS	19"	D/M	60				8.4			
9	SS	15"	D/M	45		(4.5+)		7.7			
10	SS	19"	D/M	60				7.7			
11	SS	15"	D/M	43	20	Scattered Sandy Partings and Pockets	(4.5+)	8.4			
12	SS	23"	M	80			(4.5+)	12.0			
13	SS	22"	D/M	97			(4.5+)	9.8			
14	SS	22"	M	50			(4.5+)	12.7			
15	SS	14"	W	83			(4.5+)	11.0	17	10	
					30	*Very Stiff, Yellowish Gray Lean CLAY, Little Sand, Trace Gravel (CL)					
16	SS	16"	W	105			*	33.5'	2.5/ 2.75)	25.3	
RUN NO.	INTERVAL (ft)	REC (%)	RQD (%)		35	Interbedded Gray SHALE and LIMESTONE, Horizontally Jointed, Joints Shaley, Limestone Fresh, Beds Vary from 2-6"	Fractures/ft.				
1	85.5-405	65	16				9 9 10 7		19 min. 325-375 450 PSI	RPM	
2	40.5-455	98	37				7 9 10 5 10		14 min. 350-400 450 PSI	RPM	
								()	Pocket Penetrometer Reading, TSF		

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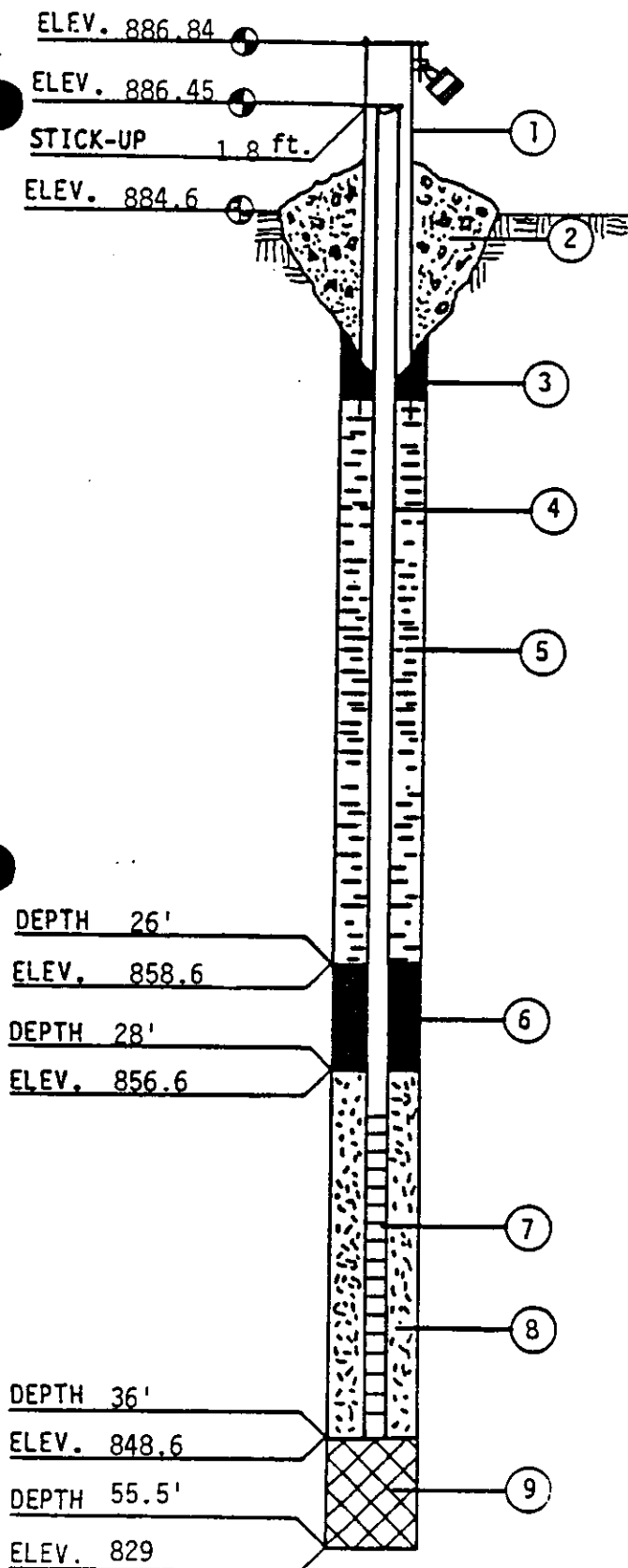
WARZYN**ENGINEERING INC****LOG OF TEST BORING**

Project Groundwater Assessment Program
 Aber Road Facility-Cecos International
 Location Williamsburg, Ohio
 N3760, E5168

Boring No. MP254
 Surface Elevation 884.6
 Job No. 600055
 Sheet 2 of 2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES							
Recovery		Moisture		N	Depth		q _u	W	LL	PL	D			
No.	Type	↓	↓											
RUN NO.	INTERVAL (ft)	REC (%)	RQD (%)			Fractures/ft.								
3	45.5-50.5	86	26		50	Interbedded Gray SHALE and LIMESTONE, Horizontally Jointed, Joints Shaley, Limestone Fresh, Beds Vary from 2-6"	9		21 min.					
							8		350-400	RPM				
							6		450	PSI				
							7							
4	50.5-55.5	102	30		55		6		350	RPM				
							9		450	PSI				
							8							
							10							
							4							
End Boring at 55.5' on 3/26/87														
Ran packer test and installed groundwater monitoring well. See separate detail sheets.														
WATER LEVEL OBSERVATIONS						GENERAL NOTES								
While Drilling _____						3/24/86 3/26/86								
Upon Completion of Drilling _____						Start _____ Complete _____								
Time After Drilling _____						Crew Chief LL Rig CME 55								
Depth to Water _____						Drilling Method 6" ID HSA								
Depth to Cave In _____						0-34', DC 8" 0-34'								
						DC 3" 0-35.5', 6 7/8" RB								
						34-40'								



* 36-37': Sand
 37-39': Bentonite Pellets
 39-55.5' Slough

MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 600055

BORING/WELL NO. MP 254

DATE 3/27/86

CHIEF/UNIT LL/9230

1. PROTECTIVE CASING ☒ YES NO
 LOCKING ☒ YES NO
2. CONCRETE SEAL ☒ YES NO
3. TYPE OF SURFACE SEAL (IF INSTALLED)
4. SOLID PIPE TYPE Sch. 40 PVC
 SOLID PIPE LENGTH 33' ft.
 JOINT TYPE SLIP/GLUED ☒ THREADED
5. TYPE OF BACKFILL 5% Bentonite-Cement Grout
 HOW INSTALLED - ☒ TREMIE FROM SURFACE
6. TYPE OF LOWER SEAL (IF INSTALLED)
Bentonite Pellets
7. SCREEN TYPE Sch. 40 PVC
 SCREEN LENGTH 5.0 Ft.
 SLOT-SIZE 0.010 LENGTH 4 ft.
 SCREEN DIAMETER 4 in.
8. TYPE OF BACKFILL AROUND SCREEN
Ottawa Silica Filter Sand
9. TYPE OF BACKFILL *
10. DRILLING METHOD 34-40': RWB (8")
0-34': HSA (6 1/4")
NQ Rock Core 35.5-55.5'
11. ADDITIVES USED (IF ANY)
(Clear Water)

WATER LEVEL DATE

*ALL DEPTHS MEASURED FROM GROUND SURFACE.



WARZYN**ENGINEERING INC****LOG OF TEST BORING**

Project Groundwater Assessment Program
 Aber Road Facility-Cecos International
 Location Williamsburg, Ohio
 N5479, E5468

Boring No. MP255
 Surface Elevation 908.7
 Job No. 600055
 Sheet 1 of 2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES					
Recovery			Moisture				q _u	W	LL	PL	D	
No.	Type	↓	↓	N	Depth							
1	3"SS	3"	D/M	59		FILL: Hard, Brown & Gray Lean Clay, Some Sand & Crushed Stone		9.0				
2	SS	24"	W	18		Very Stiff, Brown and Gray Mottled Lean CLAY, Little Sand, Trace Gravel to Sandy Lean Clay (CL) Stained 8.5-9.0' Gray Sandy Clay Pockets near 9-10'	(2.5)	18.0				
3	3"SS	3"	M	13	5				16.6			
4	SS	24"	W	20					20.8	21	12	
5	3"SS	24"	W	19	10			(2.5)	19.9			
6	SS	9"	W	22		Grades with more Sand and Gravel near 13', Hard Hard, Brown Sandy Lean CLAY, Little Gravel, Stained on Horizontal Fractures (CL) Hard, Gray Silty CLAY, Some Sand, Little Gravel (CL-ML)	(2.75)	18.4				
7	3"SS	24"	W	83			(4.5+)	24.4				
8	SS	18"	D/M	167	15		(4.5+)	8.2				
9	3"SS	24"	D/M	169			(4.5+)	7.8				
10	SS	24"	M	85	20	*	(4.5+)	10.3				
11	3"SS	24"	D/M	176		Hard, Gray Silty to Lean CLAY, Some Sand and Gravel (CL/CL-ML) *Very Dense, Brown Fine to Coarse SAND & GRAVEL, Some Silt and Clay (SC-SM)	(4.5+)	8.3				
12	SS	15"	D/M	169			(4.5+)					
13	SS	24"	D/M	40	25		(4.5+)	9.3				
14	SS	24"	M	65				6.8				
15	SS	24"	M	76	30			6.7				
16	SS	18"	M	77	35		(4.5+)	7.2				
17	SS	18"	M	77	40		(4.5+)	7.4				
					45							
							() Pocket Penetrometer Reading, TSF					

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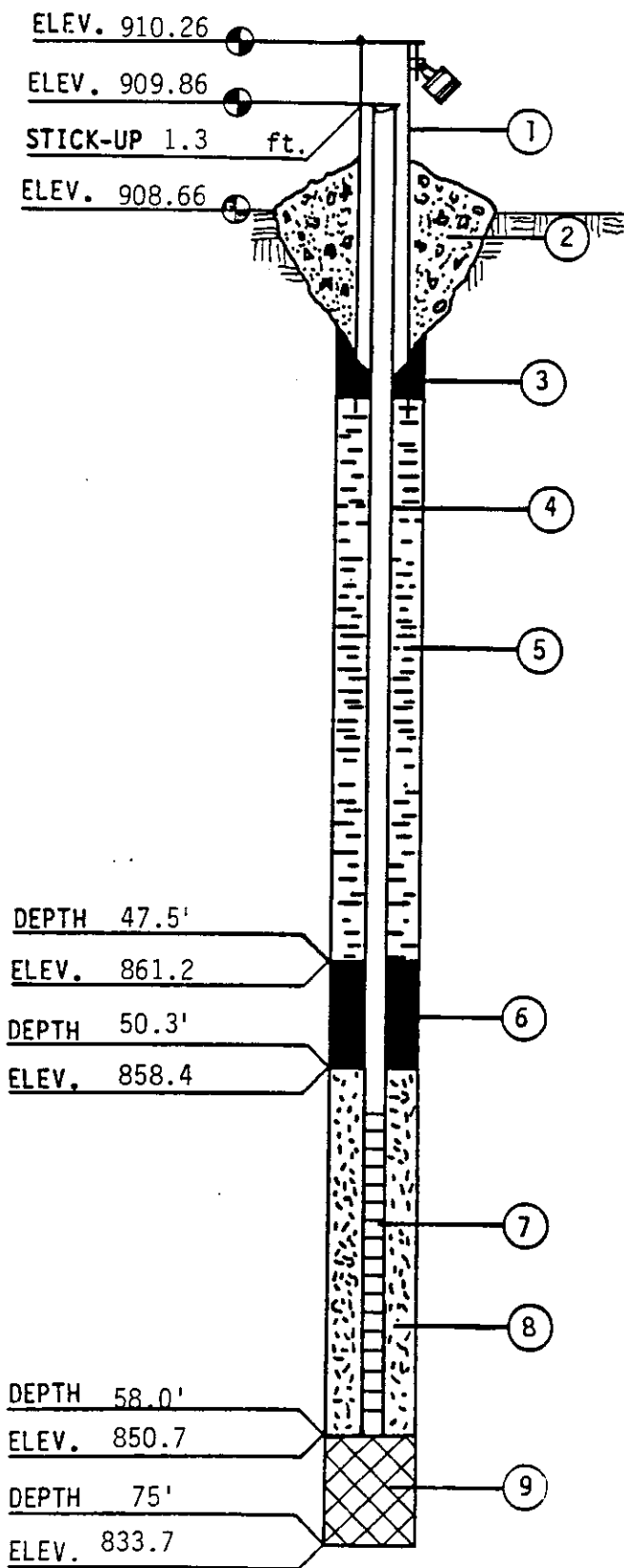
WARZYN**ENGINEERING INC****LOG OF TEST BORING**

Project Groundwater Assessment Program
Aber Road Facility-Cecos International
 Location Williamsburg, Ohio
N5479, E5468

Boring No. MP255
 Surface Elevation 908.7
 Job No. 600055
 Sheet 2 of 2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture		Depth		q _u	W	LL	PL	D
No.	Type	↓	↓	N							
ST1	3"PS16"		M	-		Hard, Gray Silty to Lean CLAY, Some Sand and Gravel (CL/CL-ML)	(4.5+)				
					50						
18	SS	0"		-	73	Dense, Gray Fine to Medium SAND (SP) * 54.2'	(4.5+)				
19	SS	18"	W	62							
20	SS	3"	M	60/3"	55	Interbedded Gray SHALE and LIMESTONE, Horizontally Jointed, Joints Shaley, Limestone Fossiliferous, Beds Vary from 1-6"	Fractures/ft.				
21	SS	NR	-	30/0"							
RUN NO.	INTERVAL (ft)	REC (%)	RQD (%)				9		24 min.		
1	55-64.3	60	27		60		4		300 RPM		
							4		250 PSI		
							2				
							6				
2	64.3-70'	95	14		65	*Hard, Gray Silty to Lean CLAY, Some Sand and Gravel (CL/CL-ML)	11		21 min.		
							1		300 RPM		
							4		250 PSI		
							3				
							5				
3	70-75'	95	40		70		8		18 min		
							4		300 RPM		
							3		250 PSI		
							4				
							3				
					75	End Boring at 75.0' on 3/21/86 Ran packer test and installed groundwater monitoring well. See separate detail sheets.					
					80						
					85						
WATER LEVEL OBSERVATIONS						GENERAL NOTES					
While Drilling _____						3/13/86 3/21/86					
Upon Completion of Drilling _____						Start _____ Complete _____					
Time After Drilling _____						Crew Chief MM Rig CME 55					
Depth to Water _____						6 1/4" ID HSA					
Depth to Cave In _____						Drilling Method 0-45.0', DC 8" 0-45.0', DC 3" 0-55.0', 6 7/8" RB 45.0-62.5'					



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 600055

BORING/WELL NO. MP255

DATE 3/21/86 to 3/22

CHIEF/UNIT CB/9100

1. PROTECTIVE CASING (YES) NO
LOCKING (YES) NO
2. CONCRETE SEAL (YES) NO
3. TYPE OF SURFACE SEAL (IF INSTALLED)

4. SOLID PIPE TYPE Sch. 40 PVC
SOLID PIPE LENGTH 55 ft.
JOINT TYPE SLIP/GLUED (THREADED)
5. TYPE OF BACKFILL 4% Bentonite-Cement grout
HOW INSTALLED - (TREMIE)
FROM SURFACE
6. TYPE OF LOWER SEAL (IF INSTALLED)
Bentonite Pellets
7. SCREEN TYPE Sch. 40 PVC
SCREEN LENGTH 5.0'
SLOT-SIZE 0.010 LENGTH 4.0 ft.
SCREEN DIAMETER 4.0 in.
8. TYPE OF BACKFILL AROUND SCREEN
Ottawa Silica Filter Sand
9. TYPE OF BACKFILL 58-59' sand; 60-75' Cuttings
59-60' Bent. Pellets
NQ Rock Core 64-75'
10. DRILLING METHOD HSA 0-45', WB 45-62.5'
11. ADDITIVES USED (IF ANY)
(Clear Water)

WATER LEVEL _____ DATE _____

*ALL DEPTHS MEASURED FROM GROUND SURFACE.



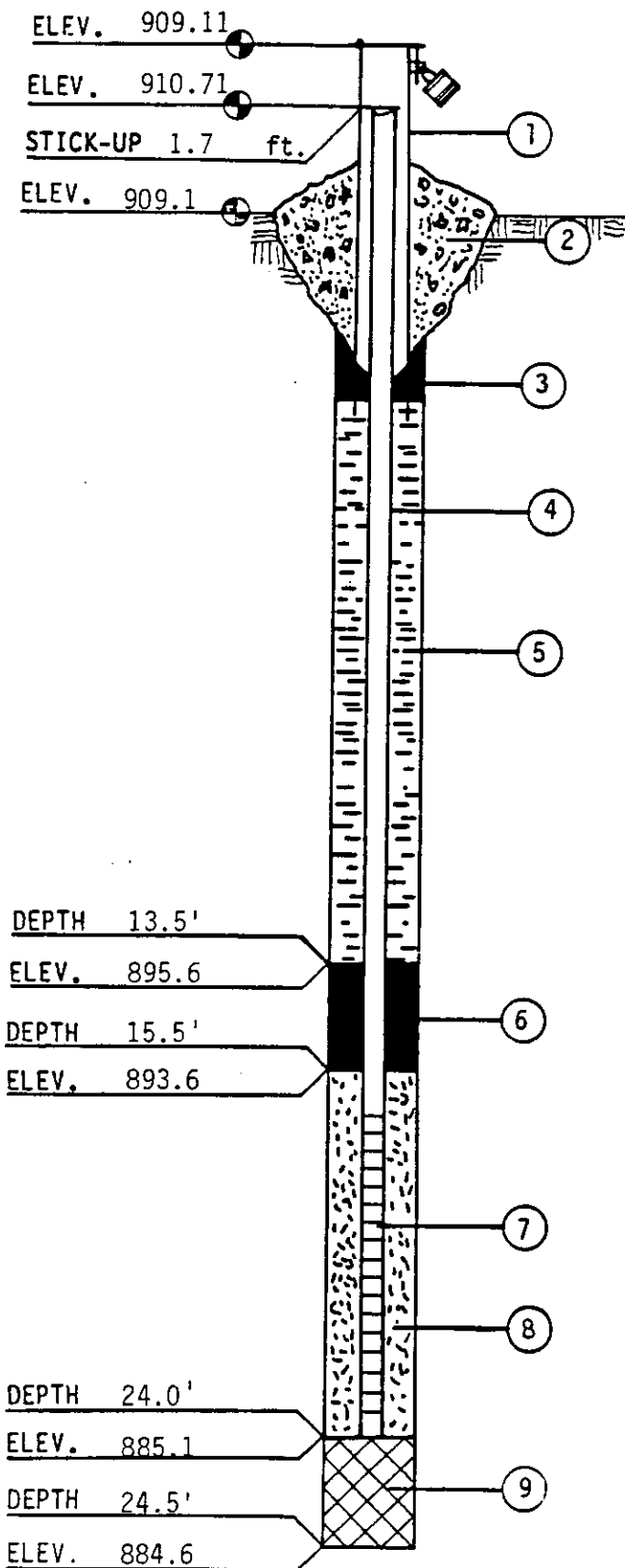
WARZYN**ENGINEERING INC****LOG OF TEST BORING**

Project Groundwater Assessment Program
Aber Road Facility-Cecos International
 Location Williamsburg, Ohio
N5475, E5468

Boring No. MP255A
 Surface Elevation 909.1
 Job No. 600055
 Sheet 1 of 1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	Type	Recovery	Moisture	N	Depth		q _u	W	LL	PL	D
		↓	↓								
						Blind Drill 0-19.5' See Log of MP255 for Detailed Soil Classification SOIL					
1	3"SS 16"		D/M	236	20	Brown Sandy Lean CLAY (CL) Blind drill 21-24.5'		8.6	41	13	
					25	End Boring at 24.5' on 3/22/86 Installed groundwater monitoring well. See separate detail sheet.					
					30						
					35						
					40						
WATER LEVEL OBSERVATIONS						GENERAL NOTES					
While Drilling _____						3/22/86 3/22/86					
Upon Completion of Drilling _____						Start _____ Complete _____					
Time After Drilling _____						Crew Chief <u>CB</u> Rig <u>CME 55</u>					
Depth to Water _____						Drilling Method <u>6 1/4" ID HSA</u>					
Depth to Cave In _____						<u>0-24.5'</u>					



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 600055

BORING/WELL NO. MP255A

DATE 3/22/86

CHIEF/UNIT CB/9100

1. PROTECTIVE CASING ☒ YES NO
LOCKING ☒ YES NO
2. CONCRETE SEAL ☒ YES NO
3. TYPE OF SURFACE SEAL (IF INSTALLED)

4. SOLID PIPE TYPE Sch 40 PVC
SOLID PIPE LENGTH 25 ft.
JOINT TYPE SLIP/GLUED ☒ THREADED

5. TYPE OF BACKFILL 5% Bentonite-Cement Grout
HOW INSTALLED - ☒ TREMIE FROM SURFACE

6. TYPE OF LOWER SEAL (IF INSTALLED)
Bentonite Pellets

7. SCREEN TYPE Sch 40 PVC
SCREEN LENGTH 5.0 ft.
SLOT-SIZE 0.010 LENGTH 4.0 ft.
SCREEN DIAMETER 4.0 in.

8. TYPE OF BACKFILL AROUND SCREEN
Ottawa Silica Filter Sand

9. TYPE OF BACKFILL Sand

10. DRILLING METHOD 6 1/4" HSA

11. ADDITIVES USED (IF ANY)
(Clear Water)

WATER LEVEL DATE

*ALL DEPTHS MEASURED FROM GROUND SURFACE.



LOG OF TEST BORING

Groundwater Assessment Program
Project Aber Road Facility-Cecos International
Location Williamsburg, Ohio
N5441, E5348

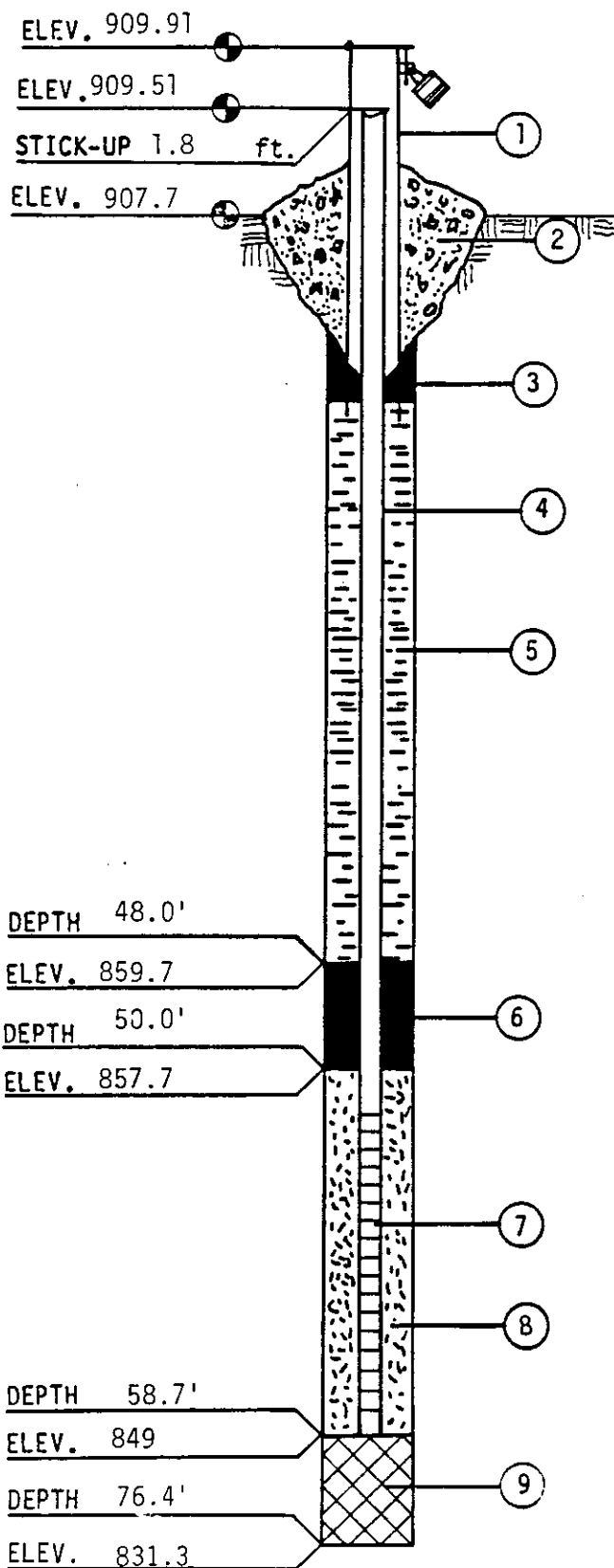
Boring No. MP256
Surface Elevation 907.7
Job No. C 600055
Sheet 1 of 2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				q _u	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
1	SS	5"	M	36		Brown Lean CLAY, Little Sand, Trace Gravel (CL)		16.3			
2	SS	18"	M	17		Stiff to Very Stiff, Brown and Gray Mottled Lean CLAY, Little Sand, Trace Gravel (CL)	(1.5- 3.2)	21.4			
3	SS	18"	M	11	5		(2.5)	23.9			
4	SS	18"	M	12			(2.25)	21.7			
5	SS	20"	M	13				22.3			
6	SS	21"	M	16	10			19.5			
7	SS	8"	D/M	89			Hard, Brown Sandy Silty CLAY, Little Gravel (CL-ML) 2" Sand Lense near 15.5'	(4.5+)	9.1		
8	SS	21"	D/M	165	15			9.2			
9	SS		D/M	91		Hard, Gray Sandy Silty CLAY, Trace Gravel (CL-ML) Scattered Brown Partings to 22' Brown and Gray 22-28'	(4.5+)	8.3			
10	SS	18"	D/M	83	20		(4.5+)	7.7	15	11	
11	SS	9"	D/M	108			(4.5+)	10.9			
12	SS	22"	D/M	133			(4.5+)	8.1			
13	SS	21"	D/M	145	25		(4.5+)	8.6	18	12	
14	SS	23"	D/M	140			(4.5+)	7.6			
15	SS	23"	D/M	126	30		(4.5+)	7.7			
16	SS	24"	D/M	95			(4.5+)	7.8			
17	SS	24"	D/M	147		(4.5+)	7.9				
18	SS	23"	W	195	35	Very Dense, Gray Fine to Coarse SAND, Some Silt & Clay, Some Gravel (SM/SC)		8.3			
19	SS	18"	D/M	167		Hard, Gray Sandy Silty CLAY, Little Gravel (CL-ML) 8" Fine to Medium Sand Lense near 39'	(4.5+)	8.0			
20	SS	22"	D/M	198	40			8.3			
21	3"SS	12"	D/M	580				8.4	17	12	
22	3"SS	18"	D/M	370				7.8			
					45		()	Pocket Penetrometer Reading, TSF			

(Continued)

(Continued)



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 600055

BORING/WELL NO. MP256

DATE 3/9/86

CHIEF/UNIT CB/9100

1. PROTECTIVE CASING ☒ YES ☐ NO

LOCKING ☒ YES ☐ NO

2. CONCRETE SEAL ☒ YES ☐ NO

3. TYPE OF SURFACE SEAL (IF INSTALLED)
None

4. SOLID PIPE TYPE SCH 40 PVC

SOLID PIPE LENGTH 55.4 ft.

JOINT TYPE SLIP/GLUED ☒ THREADED

5. TYPE OF BACKFILL 4 % Bentonite-Cement Grout

HOW INSTALLED ☒ TREMIE
FROM SURFACE

6. TYPE OF LOWER SEAL (IF INSTALLED)
Bentonite Pellets

7. SCREEN TYPE SCH 40 PVC

SCREEN LENGTH 5.0'

SLOT-SIZE 0.010" LENGTH 4.0 ft.

SCREEN DIAMETER 4.0 in.

8. TYPE OF BACKFILL AROUND SCREEN
Ottawa Silica Filter Sand

9. TYPE OF BACKFILL Pellets: 58.2-59.8
Cuttings: 59.8-76'

10. DRILLING METHOD 0-43': HSA/WB 43-63'
NQ Rock Core 56.4 -76.4'

11. ADDITIVES USED (IF ANY)
(Clear Water)

WATER LEVEL _____ DATE _____

*ALL DEPTHS MEASURED FROM GROUND SURFACE.



WARZYN**ENGINEERING INC****LOG OF TEST BORING**

Project Groundwater Assessment Program
 Aber Road Facility-Cecos International
 Location Williamsburg, Ohio
 N5873, E5178

Boring No. MP259
 Surface Elevation 901.8
 Job No. 600055
 Sheet 1 of 2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				q _u	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
1	SS	15"	W	8		Stiff to Very Stiff, Brown Mottled Lean CLAY, Little Sand, Trace Roots (CL)	1.0/2.5)	24.2			
2	SS	14"	W	25		Very Stiff to Hard, Brown & Gray Mottled Lean CLAY; Trace Sand and Gravel (CL) Gray Sand Partings near 4'	4.0/4.5)	20.5			
3	SS	21"	W	22	5		2.25/3.25)	17.9			
4	SS	21"	D/M	64			4.5+)	9.0			
5	SS	22"	D/M	80	10	Hard, Brown Sandy Lean CLAY, Trace Gravel (CL) Scattered Sand Pockets and Stained Partings	4.5+)	8.6	21	13	
6	SS	21"	D/M	80			4.5+)	7.7			
7	SS	18"	D/M	96			4.5+)	7.5			
8	SS	0" - 10 7/6"			15	Hard, Gray Sandy Silty CLAY, Trace to Little Gravel (CL-ML) Brown Partings near 26'	(4.5+)	8.4			
9	SS	14"	D/M	93			(4.5+)	8.2			
10	SS	21"	D/M	81			(4.5+)	7.8	19	13	
11	SS	16"	D/M	89	20		(4.5+)	7.5			
12	SS	21"	D/M	118				6.3			
13	SS	15"	D/M	196				6.9			
14	SS	18"	D/M	181	25			23.2			
15	SS	4"	W	100				7.0			
16	SS	12"	D/M	186				7.0			
17	SS	12"	D/M	166				7.1			
18	SS	18"	D/M	205	30			7.1			
19	SS	12"	D/M	162			4.5+)	8.5			
20	SS	12"	D/M	195	35		2.5/4.0)*		16	12	
21	3"SS	12"	D/M	571			4.5+)	7.3			
22	3"SS	12"	D/M	895							
23	SS		D/M	74	40			7.7			
								*10.5			
24	SS	15"	D/M	169				7.6			
25	SS	15"	D/M	108	45		9.7				
						()	Pocket Penetrometer Reading, TSF				

(Continued)

(Continued)

LOG OF TEST BORING

Groundwater Assessment Program
Project
Aber Road Facility-Cecos International
Location Williamsburg, Ohio
N5873, E5178

MP259

Boring No. _____
Surface Elevation 901.8
Job No. 600055
Sheet 2 of 2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

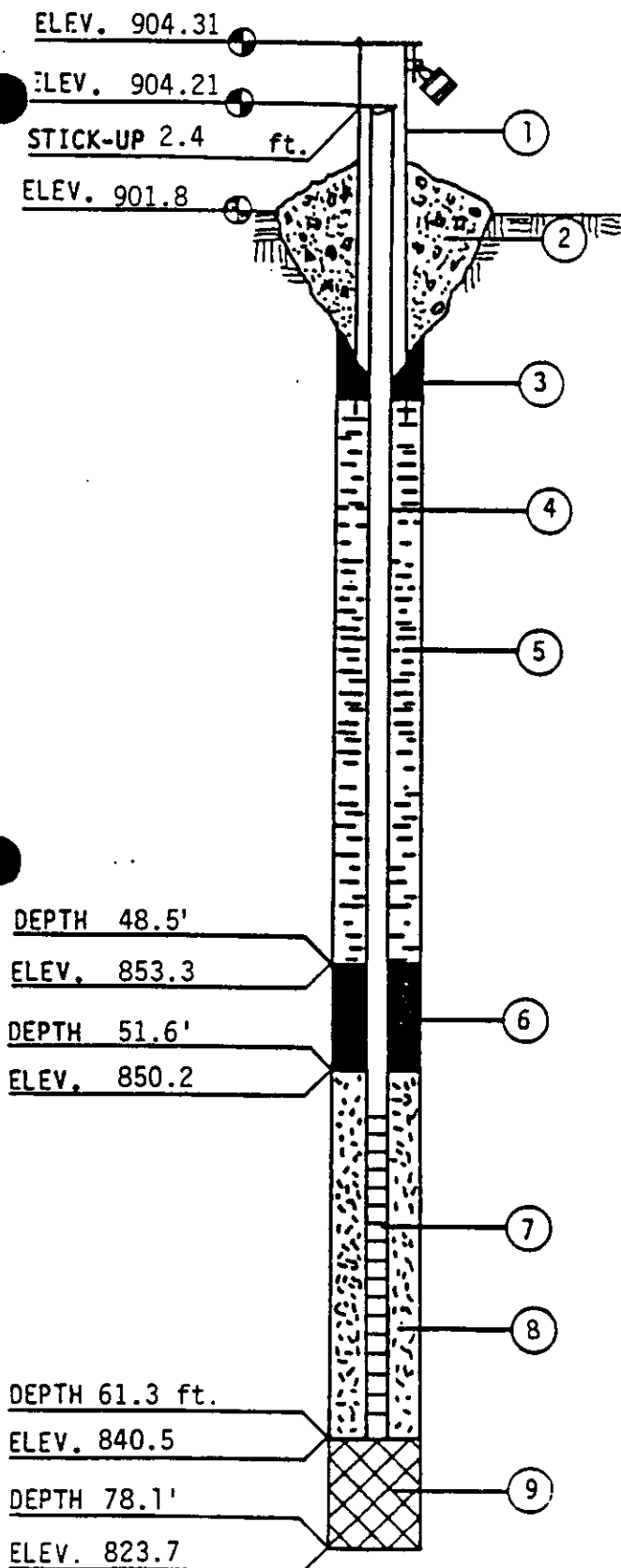
SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				q _u	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
						Hard, Gray Sandy Silty CLAY, Trace to Little Gravel (CL-ML) Grades to Gray Sandy Lean CLAY (CL) With Scattered Brown Sandy Partings 58.0'					
26	SS	17"	D/M	132	50		(4.5+) 8.2				
							8.6	22	14	(combined	
27	SS	18"	M	121	55		(4.5+) 11.7	24	14		
28	SS	0"	- 100 0"				Fracture/ft				
RUN NO.	INTERVAL (ft)	REC (%)	RQD (%)			Interbedded Gray SHALE and LIMESTONE, Horizontally Jointed, Joints Shaley, Limestone Fresh, Predominantly Shale with Limestone Beds 1 to 5"	6				
1	58.1-68.1	93	44				5				
							9				
							3				
							5				
							3				
							1				
							4				
							3				
							1				
2	68.1-78.1	103	75				2				
							5				
							6				
							6				
							1				
							1				
							3				
							2				
							1				
							4				
							1				
						End Boring at 78.1' on 3/12/86 Ran packer test and installed groundwater monitoring well. See separate detail sheets.					
							() Pocket Penetrometer Reading, TSF				

WATER LEVEL OBSERVATIONS

While Drilling _____
Upon Completion of Drilling _____
Time After Drilling _____
Depth to Water _____
Depth to Cave In _____

GENERAL NOTES

3/6/86 3/12/86
Start Complete
Crew Chief SJW Rig CME 75
Drilling Method 6 1/2" ID HSA
0-54.0', DC 8" 0-54',
6-7/8" RB 54-58', DC 3" 0-58',
6-7/8" RB 58-63.2'



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 600055

BORING/WELL NO. MP259

DATE 3/13/86

CHIEF/UNIT 9200/TCR

1. PROTECTIVE CASING ☒ YES ☐ NO

LOCKING ☒ YES ☐ NO

2. CONCRETE SEAL ☒ YES ☐ NO

3. TYPE OF SURFACE SEAL (IF INSTALLED)

4. SOLID PIPE TYPE Sch. 40 PVC

SOLID PIPE LENGTH 58.5 ft.

JOINT TYPE SLIP/GLUED ☒ THREADED

5. TYPE OF BACKFILL 6% Bentonite Cement Grout

HOW INSTALLED - ☒ TREMIE
FROM SURFACE

6. TYPE OF LOWER SEAL (IF INSTALLED)

Bentonite Pellets

7. SCREEN TYPE Sch. 40 PVC

SCREEN LENGTH 5.0 ft

SLOT-SIZE 0.010' LENGTH 4.0 ft.

SCREEN DIAMETER 4 in.

8. TYPE OF BACKFILL AROUND SCREEN

Ottawa Silica Filter Sand

9. TYPE OF BACKFILL Bentonite Pellets 62.3-63.2'

10. DRILLING METHOD Washbore 54-63.2 ft.

11. ADDITIVES USED (IF ANY) NO Rock Core 58-78'

(Clear Water)

WATER LEVEL DATE

*ALL DEPTHS MEASURED FROM GROUND SURFACE.

WARZYN



ENGINEERING INC

WARZYN**ENGINEERING INC****LOG OF TEST BORING**

Project Groundwater Assessment Program
 Aber Road Facility-Cecos International
 Location Williamsburg, Ohio
 N5870, E5433

MP260

Boring No. 908.8
 Surface Elevation 600055
 Job No. 1 of 2
 Sheet 1 of 2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				q _u	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
					5	Blind drill 0-24.0'. See log of Boring MP260A for detailed soil description. SOIL					
					10						
					15						
					20						
1	3"SS	18"	D/M	125	25	Hard, Gray Sandy Lean CLAY, to Silty CLAY with Some Sand, Trace to Little Gravel (CL/CL-ML)	(4.5+)	8.4	21	13	
2	3"SS		D/M	135	26						
3	SS	12"	D/M	223			(1.75)				
4	SS	12"	D/M	167			(3.75)	7.8			
					35						
					40	Possible Brown Fine to Coarse Sand Lense 43-44' (Possible drilling slough)	(4.5+)	9.9			
					45						
6	SS	17"	W	194			(4.5+)	25.1	16	9	

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WARZYN**ENGINEERING INC****LOG OF TEST BORING**

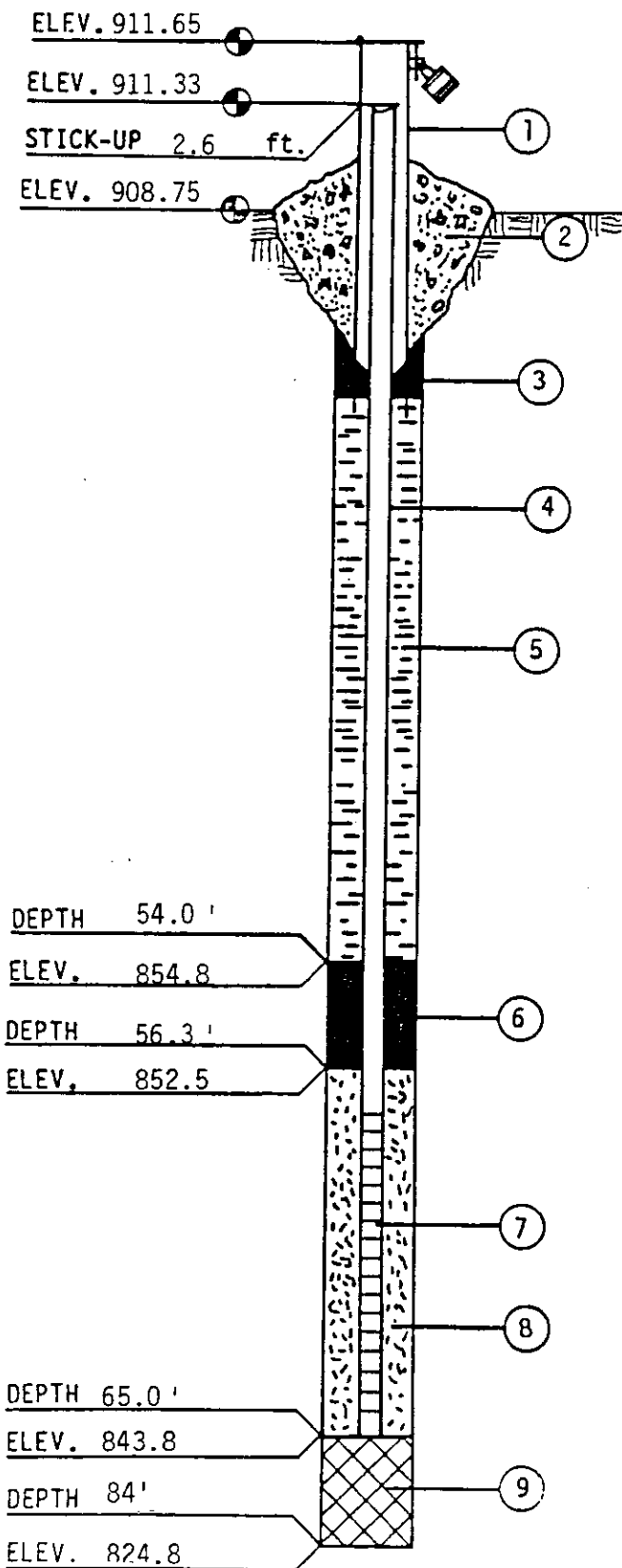
Groundwater Assessment Program

 Project Aber Road Facility-Cecos International
 Location Williamsburg, Ohio
N5870, E5433

 Boring No. MP260
 Surface Elevation 908.8
 Job No. 600055
 Sheet 2 of 2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				q _u	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
						Hard, Gray Sandy Lean CLAY to Silty CLAY with Some Sand, Trace to Little Gravel (CL/CL-ML)					
7	SS	17"	M	198	50		(4.5+)	10.6			
								7.4	21	15	(combined)
8	SS	14"	M	150	55	Possible Fine to Coarse Sand Lense 56.5-58.0' (Possible drilling slough)	(4.5+)	10.4			
9	SS	5"	M	95	60		(4.5+)				
RUN INTERVAL REC RQD NO. (ft) (%) (%)						62.0'	Fractures/ft.				
1	64-69	98	23	65	Interbedded Gray SHALE and LIMESTONE, Horizontally Jointed, Joints Shaley, Beds from 1-12"	4					
						6					
						5					
2	69-74	93	19	70		5					
						3					
						5					
3	74-79	98	20	75		7					
						10					
						2					
4	79-84	100	26	80	*Ran packer test and installed groundwater monitoring well. See separate detail sheets.	7					
						9					
						8					
				85	End Boring at 84' on 3/19/86*	6					
						8					
						2					
						6					
						8					
WATER LEVEL OBSERVATIONS						GENERAL NOTES					
While Drilling _____						3/13/86 3/19/86					
Upon Completion of Drilling _____						Start _____ Complete _____					
Time After Drilling _____						Crew Chief LL _____ Rig _____					
Depth to Water _____						Drilling Method 6 1/4" ID HSA					
Depth to Cave In _____						0-38.5, DC 8" 0-38.5', 6 7/8"					
						RB 38.5-62', DC 8" 38.5-62',					
						DC 3" 0-64", 6 7/8" RB 62-70'					



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 600055

BORING/WELL NO. MP260

DATE 3/23/86

CHIEF/UNIT 9230/LL

1. PROTECTIVE CASING ☒ YES NO
LOCKING ☒ YES NO
2. CONCRETE SEAL ☒ YES NO
3. TYPE OF SURFACE SEAL (IF INSTALLED)

4. SOLID PIPE TYPE Sch. 40 PVC
SOLID PIPE LENGTH 67' ft.
JOINT TYPE SLIP/GLUED ☒ THREADED
5. TYPE OF BACKFILL 3% Bentonite-Cement Grout
HOW INSTALLED - ☒ TREMIE FROM SURFACE
6. TYPE OF LOWER SEAL (IF INSTALLED)
Bentonite Pellets
7. SCREEN TYPE Sch. 40 PVC
SCREEN LENGTH 5.0'
SLOT-SIZE 0.010 LENGTH 4.0 ft.
SCREEN DIAMETER 4.0 in.
8. TYPE OF BACKFILL AROUND SCREEN
Ottawa Silica Filter Sand
9. TYPE OF BACKFILL Bentonite Pellets
10. DRILLING METHOD 0-38.5' HSA (6 1/4")
RWB (8") 38.5-70.0'
NO Rock Core 64-84'
11. ADDITIVES USED (IF ANY)
(Clear Water)

WATER LEVEL _____ DATE _____

*ALL DEPTHS MEASURED FROM GROUND SURFACE.



Ground Water Associates, Inc.

CONSULTING HYDROGEOLOGISTS

6 1/2 N. STATE STREET
WESTERVILLE, OHIO 43081

PAGE 1 OF 1

JOB NO 321-081		BORE HOLE NO MP 264	
PROJECT CECOS International, Aber Road		LOCATION between MP 220 and MP 219	
DRILLING CONTRACTOR Duncan Brothers Drilling, Inc.		DRILLING EQUIPMENT Davey M-7 air rotary	
GWA HYDROGEOLOGIST Jeff Schick, David Silbaugh		DRILLER Jim White	
DATE START / TIME 12-17-86 1330 hrs	DATE FINISH / TIME 12-19-86 0930 hrs	SURFACE ELEVATION 908.1	TOTAL DEPTH 24.0 ft.
WELL CASING Schedule 40 PVC	SCREEN TYPE Schedule 40 PVC	LENGTH 5.0 ft.	SLOT 0.010 in.

GROUND WATER					CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	WEATHER	TYPE	PVC		split spoon	
				DIAMETER	4 in ID		1-1/2" ID	
				HAMMER WEIGHT			300 lbs.	
				FALL			30 in.	

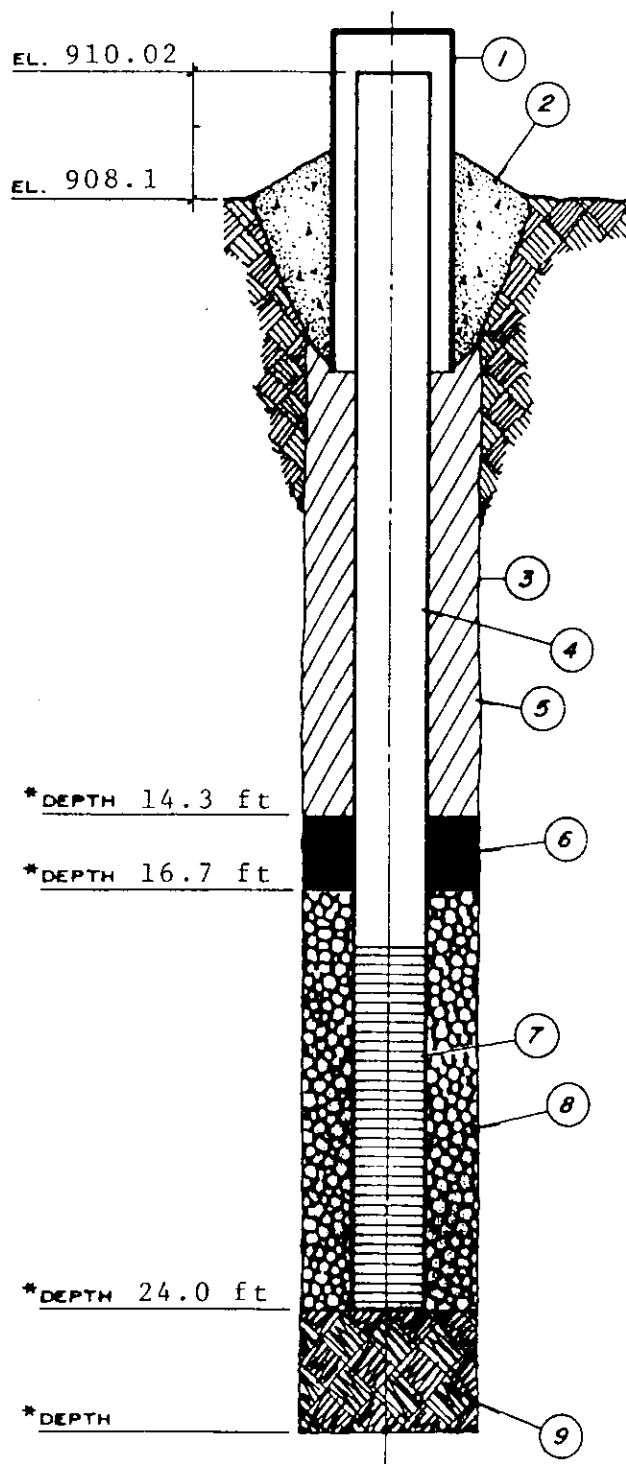
REMARKS

				BORE HOLE LOG		GRAPHIC LOG
DEPTH (FT.)	SAMPLE NO	BLOW COUNT PER 6 IN.	RECOVERY (IN.)	LITHOLOGIC DESCRIPTION	REMARKS	
5	1	1,1,2,2	14	TOPSOIL, dark brown. Mottled gray and light brown silty CLAY, occasional carbonaceous streaks, few rock fragments up to 1", reddish brown color in top 2.0' plastic, soft, moist.	PID = 0 for all samples	
	2	1,2,3,4	21			
	3	2,3,4,4	21			
	4	1,3,3,5	23			
	5	2,3,4,5	21			
10	6	1,12,21,34	24	Dark brown silty clay TILL, sub round gravel up to 1/4", soft, plastic, moist.	wet zone at 9.5'-10', gray silty clay.	
15	7	16,33,100	18	Gray silty clay TILL, sub round gravel up to 1/2", sandy (coarse grained) from 16.0'-16.3', hard to very hard at bottom of hole, moist.		
	8	15,24,31,34	24			
	9	17,28,33,44	23			
20	10	14,21,28,63	24			
	11	48,100	12	Coarse grained sand parting at 20.7'.	880 sand zone?	
	12	28,64,100	17			
25				Total Depth = 24.0 ft.		

MONITOR WELL COMPLETION REPORT :

WELL N^o MP 264 JOB N^o 321-081

PROJECT CECOS International, Aber Road
Williamsburg, Ohio



*all depths measured from ground surface.

1. PROTECTIVE CASING I.D. 8 INCHES.

2. SURFACE SEAL TYPE 5% bentonite grout

3. BOREHOLE DIAMETER 10 INCHES.

4. RISER PIPE:

a. Type Schedule 40 PVC

b. I.D. 4 INCHES

c. Length 21.9 FEET

d. Joint Type flush couple

5. BACKFILL:

a. Type 5% bentonite grout

b. Installation side discharge tremie

6. Type of SEAL 3/8 in bentonite pellets

7. SCREEN

a. Type Schedule 40 PVC

b. I.D. 4 INCHES

c. Slot Size 0.010 INCHES

d. Length 5 FEET

8. SCREEN FILTER TYPE #5 silica sand

9. BACKFILL TYPE natural material,
undisturbed



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WESTERVILLE, OHIO 43081

PAGE 1 OF 1

JOB NO 321-081		BORE HOLE NO MP 265	
PROJECT CECOS International, Aber Road		LOCATION northwest corner of sanitary landfill	
DRILLING CONTRACTOR Moody's of Dayton		DRILLING EQUIPMENT Gus Pech Brat/22R	
GWA HYDROGEOLOGIST David Silbaugh		DRILLER Rob Hohl	
DATE START / TIME 12-19-86 0800 hrs	DATE FINISH / TIME 12-23-86 1030 hrs	SURFACE ELEVATION 883.7	TOTAL DEPTH 29.5 ft.
WELL CASING Schedule 40 PVC	SCREEN TYPE Schedule 40 PVC	LENGTH 10 ft.	SLOT 0.010 in.

GROUND WATER				CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	WEATHER	TYPE			
				PVC	NX	split spoon	
				DIAMETER	4 in ID	2 in ID	1-1/2" ID
				HAMMER WEIGHT		300 lbs.	
				FALL		30 in.	

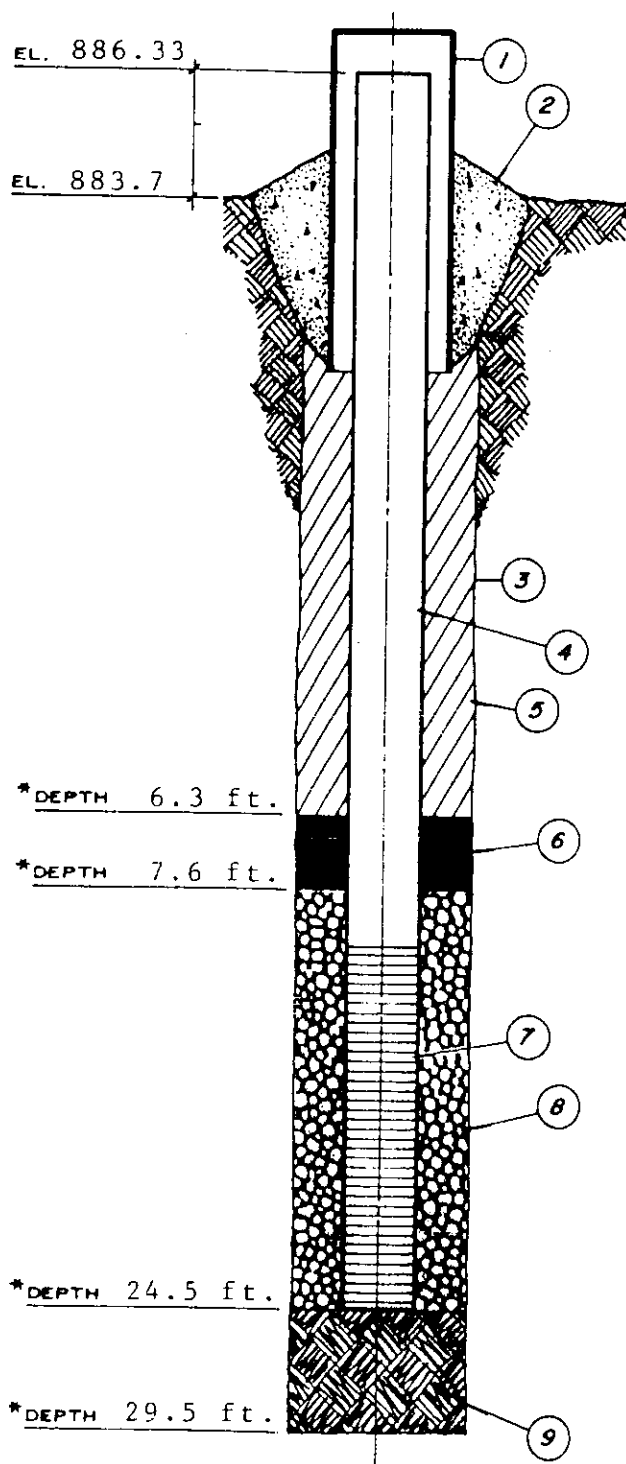
REMARKS

DEPTH (FT.)	SAMPLE NO	BLOW COUNT PER 6 IN.	RECOVERY (IN.)	BORE HOLE LOG		GRAPHIC LOG
				LITHOLOGIC DESCRIPTION	REMARKS	
	1	woh, 1 2,2	18	Dark brown fine grained sandy CLAY, few small angular gravel up to 1/8", plastic, moist, mottled gray and brown 4.0'-4.5'.	PID = 0 for all samples.	
	2	2,2, 1,3	19			
5	3	3,6, 9,18	24	Brown fine grained sandy clay TILL, sub angular gravel up to 1/4", stiff, moist.	6.0'-6.7' = Broken rock mixed with clay, no sand, saturated.	
	4	6,14, 23,20	16	Reddish brown and gray silty clay TILL, jointed with joint faces being iron stained, gravel up to 1/4", moist, hard.		
	5	10,19, 22,19	20			
10	6	15,19, 34,41	21	Gray silty clay TILL, sub round gravel up to 1", hard, moist, medium grained sand parting at 11.2'.		
	7	12,18, 25,37	22		Lined split spoon sample 14.0-16.0 ft. (permeability test)	
15	8	12,16, 23,28	22			
	9	7,14, 16,23	23			
	10	8,12, 100	18	Weathered interbedded blue gray calcareous SHALE and fossiliferous light gray limestone, bed thicknesses vary between 1/16"-8.0", vertical and high angle fractures at 22.5'-22.6' and 23.3'-23.5' respectively.	sampler refusal at 19.5 ft.	
20					NX rock core 19.5-29.5 ft. RQD = 18%	
25						

Total Depth = 29.5 ft.

MONITOR WELL COMPLETION REPORT :

WELL N^o MP 265 JOB N^o 321-081
 PROJECT CECOS International, Aber F
Williamsburg, Ohio



*all depths measured from ground surface.

1. PROTECTIVE CASING I.D. 8 INCHES.
2. SURFACE SEAL TYPE 5% bentonite grout
3. BOREHOLE DIAMETER 10 INCHES.
4. RISER PIPE :
 - a. Type Schedule 40 PVC
 - b. I.D. 4 INCHES
 - c. Length 16.8 FEET
 - d. Joint Type flush couple
5. BACKFILL :
 - a. Type 5% bentonite grout
 - b. Installation side discharge tremie
6. Type of SEAL 1/2 in. bentonite pellets
7. SCREEN
 - a. Type Schedule 40 PVC
 - b. I.D. 4 INCHES
 - c. Slot Size 0.010 INCHES
 - d. Length 10 FEET
8. SCREEN FILTER TYPE #5 silica sand
9. BACKFILL TYPE natural fill, open hole



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6 1/2 N. STATE STREET
WESTERVILLE, OHIO 43081

PAGE 1 OF 2

JOB NO 321-081		BORE HOLE NO MP 266	
PROJECT CECOS International, Aber Road		LOCATION 50' west of M 22	
DRILLING CONTRACTOR Moody's of Dayton		DRILLING EQUIPMENT Gus Pech Brat/22R	
GWA HYDROGEOLOGIST David Silbaugh		DRILLER Rob Hohl	
DATE START / TIME 12-12-86 1300 hrs.	DATE FINISH / TIME 12-17-86 1000 hrs.	SURFACE ELEVATION 896.9	TOTAL DEPTH 42 ft.
WELL CASING Schedule 40 PVC	SCREEN TYPE Schedule 40 PVC	LENGTH 10 ft.	SLOT 0.010 in.

GROUND WATER					CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	WEATHER	TYPE	PVC	NX	split spoon	
				DIAMETER	4 in ID	2 in ID	1-1/2"	ID
				HAMMER WEIGHT			300 lbs.	
				FALL			30 in.	

REMARKS

DEPTH (FT.)	SAMPLE NO	BLOW COUNT PER 6 IN.	RECOVERY (IN.)	BORE HOLE LOG		GRAPHIC LOG
				LITHOLOGIC DESCRIPTION	REMARKS	
	1	1,1,2,3	14	TOPSOIL 0.0-0.8', S&G 0.8-1.0' * Mottled gray and brown medium grained sandy CLAY, plastic grading to stiff with depth, moist.	PID = 0 for all samples.	
	2	2,3,6,7	24			
5	3	3,3,4,6	23			
	4	3,6,12,18	22			
10	5	15,19,38,58	22	Brown very fine grained sandy clay TILL, sub round gravel up to 1/4", stiff to hard, moist.	wet zone 10.0'-11.0' (no sand recovered).	
	6	21,31,38,32	13			
	7	11,15,20,24	23			
15	8	9,18,21,17	14	Gray coarse grained sandy CLAY 16.0-16.6'. Gray coarse grained SAND and sub round GRAVEL up to 1", loose, saturated.	Lined split spoon sample 14.0'-16.0'. (permeability test)	
	9	9,16,18,21	19			
20	10	6,10,12,12	14			
	11	8,14,18,26	22	Gray silty clay TILL, sub round gravel up to 1/4", broken rock fragments, hard, moist.	880 sand zone.	
	12	9,18,24,31	23			
25	13	10,17,29,33	18			
	14	9,18,23,40	22			
	15	9,16,21,28	22			

continued

* S&G sand and gravel



Ground Water Associates, Inc.
CONSULTING HYDROGEOLOGISTS
6 1/2 N. STATE STREET
WESTERVILLE, OHIO 43081

PAGE 2 OF 2

OB NO 321-081

BORE HOLE NO
MP 266

PROJECT CECOS International, Aber Road LOCATION 50' west of M 22

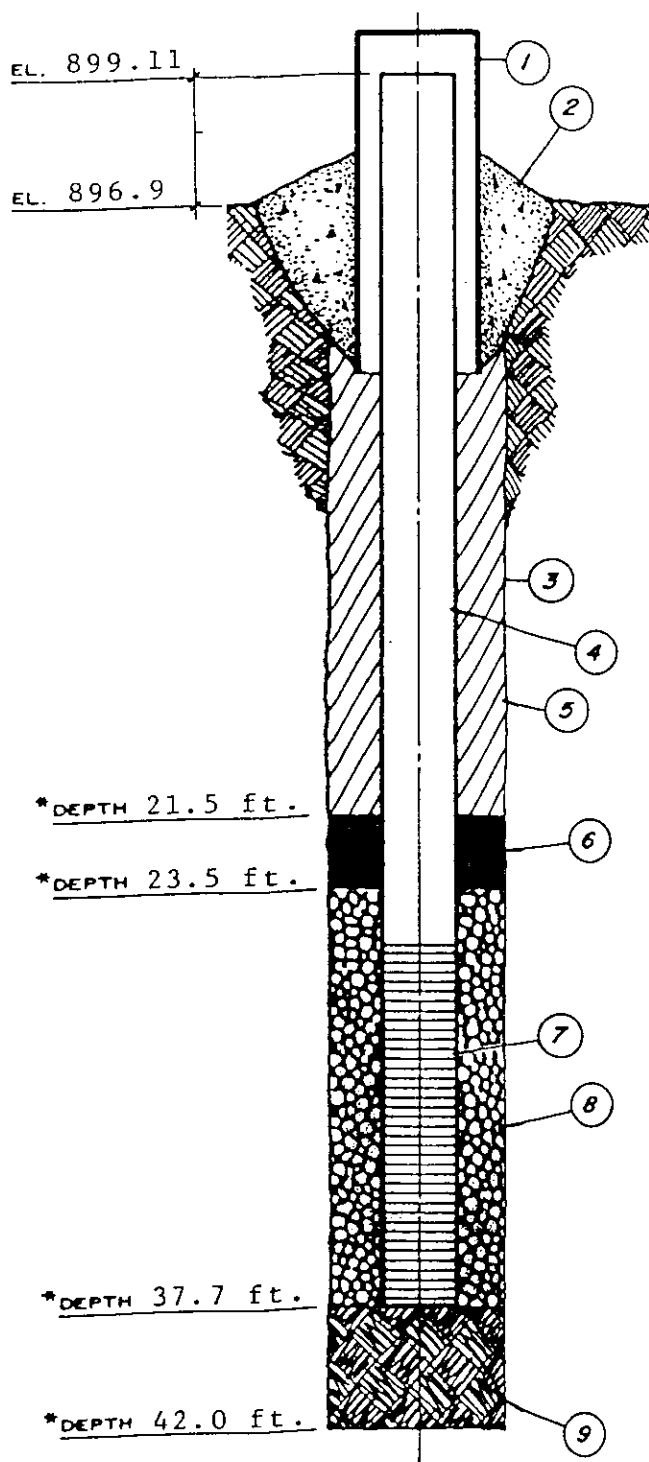
REMARKS

DEPTH (FT.)	SAMPLE NO	BLOW COUNT PER 6 IN.	RECOVERY (IN.)	LITHOLOGIC DESCRIPTION	REMARKS	GRAPHIC LOG
	16	10, 25, 27, 31	0		sampler refusal = 32.2'.	
35	17	100	2	Weathered interbedded blue gray calcareous SHALE and fossiliferous light gray LIMESTONE, bed thick- nesses vary between 1/16"-5", thin tan dolomite? bed at 36.8' (not cored intact, broken).	NX rock core 32.0' - 42.0'. RQD = 22%.	
				Total Depth = 42 ft.		

MONITOR WELL COMPLETION REPORT :

WELL N^o MP 266 JOB N^o 321-081

PROJECT CECOS International, Aber Rd.
Williamsburg, Ohio



1. PROTECTIVE CASING I.D. 8 INCHES.

2. SURFACE SEAL TYPE 5% bentonite grout

3. BOREHOLE DIAMETER 10 INCHES.

4. RISER PIPE:

a. Type Schedule 40 PVC

b. I.D. 4 INCHES

c. Length 30.4 FEET

d. Joint Type flush couple

5. BACKFILL:

a. Type 5% bentonite grout

b. Installation side discharge tremie

6. Type of SEAL 1/2 in. bentonite pellets

7. SCREEN

a. Type Schedule 40 PVC

b. I.D. 4 INCHES

c. Slot Size 0.010 INCHES

d. Length 10 FEET

8. SCREEN FILTER TYPE #5 silica sand

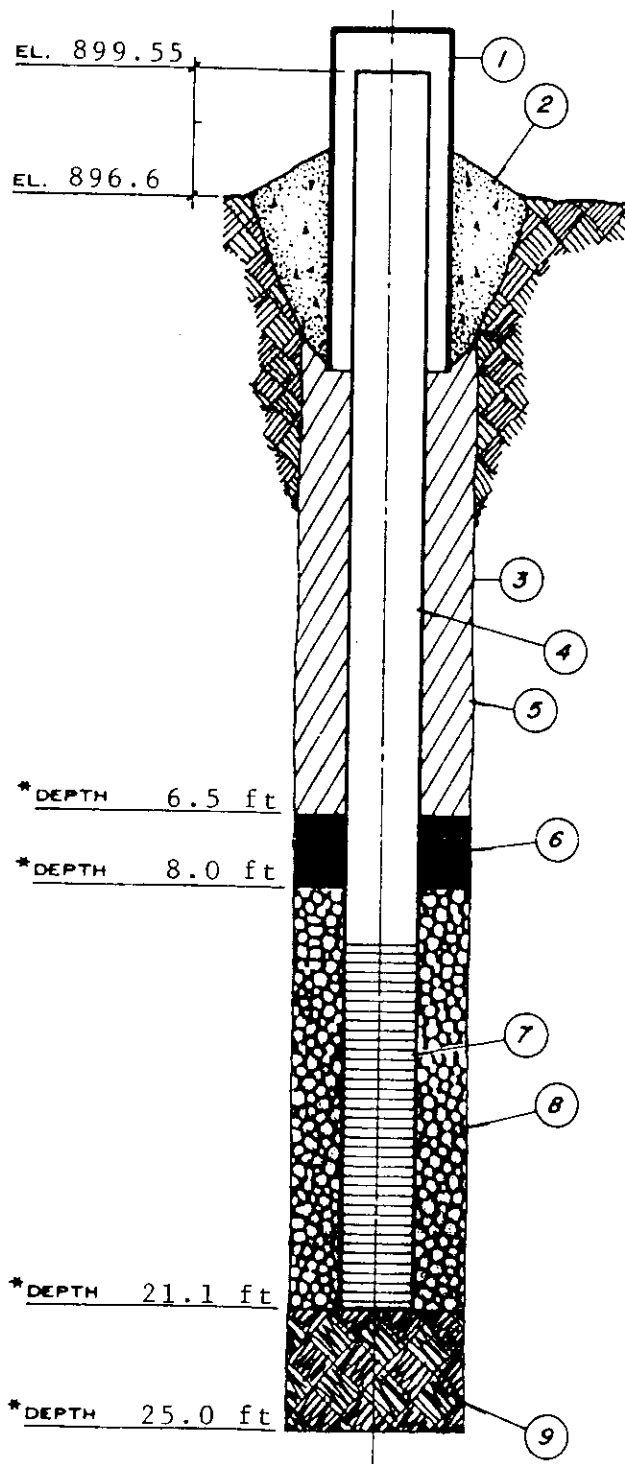
9. BACKFILL TYPE natural fill, open hole

*all depths measured from ground surface.

MONITOR WELL COMPLETION REPORT :

WELL № MP 266A JOB № 321-081

PROJECT CECOS International, Aber Rc
Williamsburg, Ohio



*all depths measured from ground surface.

1. PROTECTIVE CASING I.D. 8 INCHES.

2. SURFACE SEAL TYPE 5% bentonite grout

3. BOREHOLE DIAMETER 10 INCHES.

4. RISER PIPE:

a. Type Schedule 40 PVC

b. I.D. 4 INCHES

c. Length 14.1 FEET

d. Joint Type flush couple

5. BACKFILL:

a. Type 5% bentonite grout

b. Installation pumped

6. Type of SEAL 1/2 in. bentonite pellet:

7. SCREEN

a. Type Schedule 40 PVC

b. I.D. 4 INCHES

c. Slot Size 0.010 INCHES

d. Length 10 FEET

8. SCREEN FILTER TYPE #5 silica sand

9. BACKFILL TYPE #5 silica sand



Ground Water Associates, Inc.
CONSULTING HYDROGEOLOGISTS
6 1/2 N. STATE STREET
WESTERVILLE, OHIO 43081

PAGE 1 OF 2

JOB NO 321-081		BORE HOLE NO MP 267	
PROJECT CECOS International, Aber Road		LOCATION southwest corner of sanitary landfill	
DRILLING CONTRACTOR Moody's of Dayton		DRILLING EQUIPMENT Gus Pech Brat/22R	
GWA HYDROGEOLOGIST David Silbaugh		DRILLER Rob Hohl	
DATE START / TIME 12-9-86 1300 hrs	DATE FINISH / TIME 12-11-86 1700 hrs	SURFACE ELEVATION 889.0	TOTAL DEPTH 34.5 ft.
WELL CASING Schedule 40 PVC	SCREEN TYPE Schedule 40 PVC	LENGTH 10 ft.	SLOT 0.010 in.

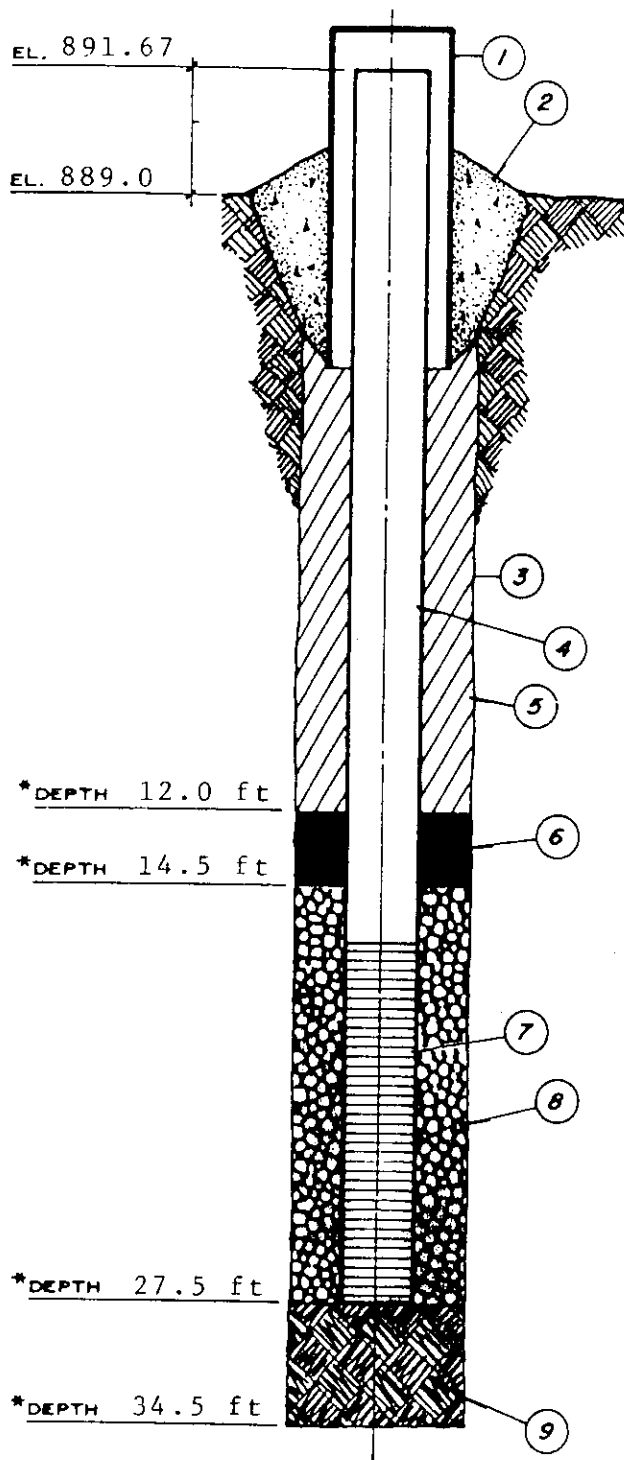
GROUND WATER					CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	WEATHER	TYPE	PVC	NX	split spoon	
12-18-86	1415 hrs	4.27 ft	40° F, rain	DIAMETER	4 in ID	2 in ID	1-1/2"	ID
				HAMMER WEIGHT			300 lbs.	
				FALL			30 in.	

REMARKS

DEPTH (FT.)	SAMPLE No	BLOW COUNT PER 6 IN.	RECOVERY (IN.)	BORE HOLE LOG		GRAPHIC LOG
				LITHOLOGIC DESCRIPTION	REMARKS	
5	1	woh, 2 3,5	17	Mottled light brown and light gray fine to medium grained sandy CLAY, trace of gravel up to 1/4", plastic, moist.	PID = 0 for all samples.	
	2	4,4, 5,8	17			
	3	5,11, 12,13	24	Light brown medium to coarse grained sandy clay TILL, sub round gravel up to 1/4", moist, stiff to hard. Vertical iron stained joint 8.2'-9.2'.		
	4	3,7, 24,50	16			
	5	9,10, 27,43	24			
10	6	9,7, 19	18	Gray silty clay TILL, sub round gravel up to 1/4", moist, hard. Vertical iron stained joint 11.8'-12.0'.		
	7	12,19, 30	12			
	8	10,22, 45	18			
	9	17,27, 37	18			
	10	12,30, 47	12			
15	11	14,21, 28	17		Lined split spoon sample 16'-17.5'. (permeability test)	
	12	15,27, 33	18			
	13	14,34, 33	16			
	14	10,13, 19	16			
	15	10, 100	0			
25				23.5'-24.5' basal sand? (no recovery) sampler pulled out wet and with little resistance.	sampler refusal = 24.5'.	
				Weathered interbedded blue gray calcareous SHALE and fossiliferous light gray LIMESTONE, bed thicknesses vary between 1/16"-6", rare pyrite blebs on limestone partings.	NX rock core 24.5'-34.5'. RQD = 34%.	

MONITOR WELL COMPLETION REPORT :

WELL N^o MP 267 JOB N^o 321-081
PROJECT CECOS International, Aber Rd.
Williamsburg, Ohio



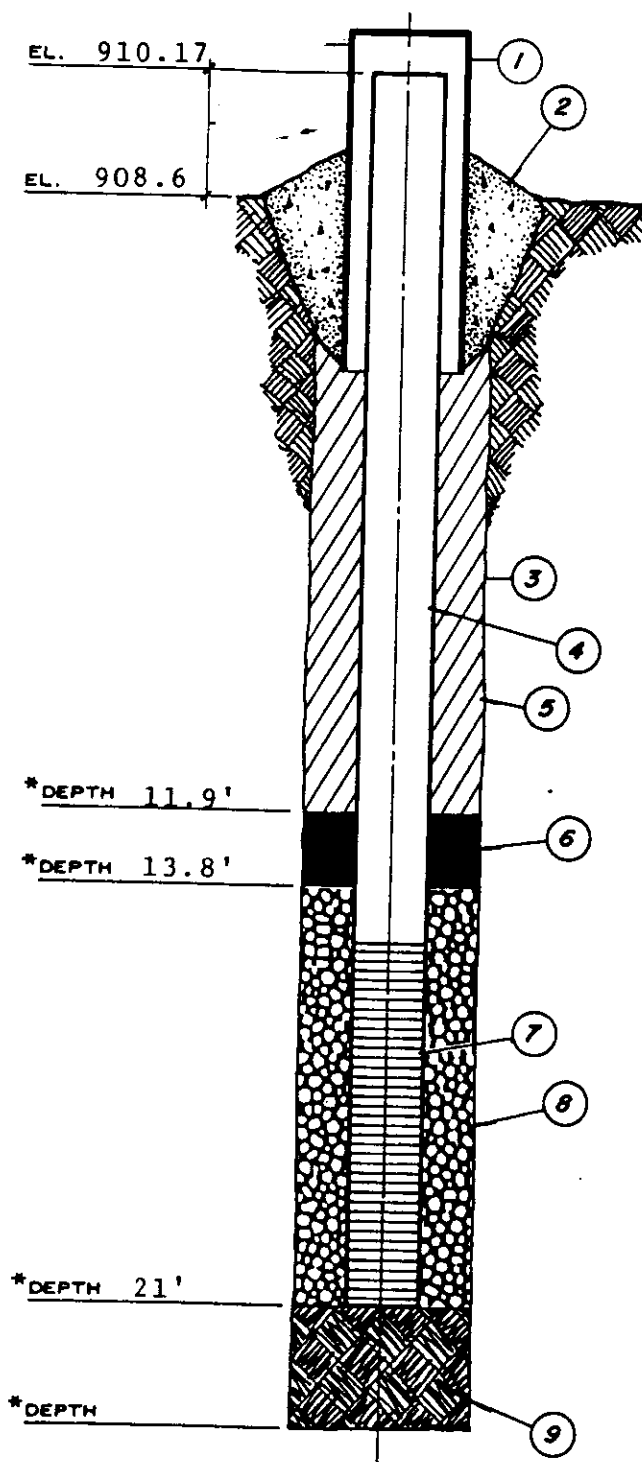
*all depths measured from ground surface.

1. PROTECTIVE CASING I.D. 8 INCHES.
2. SURFACE SEAL TYPE 5% bentonite grout
3. BOREHOLE DIAMETER 10 INCHES.
4. RISER PIPE:
 - a. Type Schedule 40 PVC
 - b. I.D. 4 INCHES
 - c. Length 20.7 FEET
 - d. Joint Type flush couple
5. BACKFILL:
 - a. Type 5% bentonite grout
 - b. Installation side discharge tremie
6. Type of SEAL 1/2 in. bentonite pellets
7. SCREEN
 - a. Type Schedule 40 PVC
 - b. I.D. 4 INCHES
 - c. Slot Size 0.010 INCHES
 - d. Length 10 FEET
8. SCREEN FILTER TYPE #5 silica sand
9. BACKFILL TYPE natural fill, open hole

MONITOR WELL COMPLETION REPORT :

WELL N^o MP268 JOB N^o 321-081

PROJECT CECOS International-Aber
installed 12/23/86



1. PROTECTIVE CASING I.D. 8 INCHES.

2. SURFACE SEAL TYPE 5% bentonite grout

3. BOREHOLE DIAMETER 10 INCHES.

4. RISER PIPE:

a. Type 304 stainless-steel

b. I.D. 4 INCHES

c. Length 18 FEET

d. Joint Type flush thread coupled

5. BACKFILL:

a. Type 5% bentonite grout

b. Installation side discharge tremie

6. Type of SEAL 3/8-in. bentonite pelle

7. SCREEN

a. Type 304 stainless-steel

b. I.D. 4 INCHES

c. Slot Size 0.010 INCHES

d. Length 5 FEET

8. SCREEN FILTER TYPE #5 silica sand

9. BACKFILL TYPE native material,
undisturbed

*all depths measured from ground surface.

RECORD OF BORING NO.

B-512 & MP-269

Client: CECOS International

Page: 1 of 2

Project: Hydrogeological Investigation of Cells 16-27

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
910.70	0.0	Topsoil Mottled brown & gray clayey silt, organics moist	1	0.0-2.0	SS	1-1-1-1	24
			2	2.0-4.0	SS	3-2-2-1	24
907.90	2.8	Mottled brown & gray silty clay, trace organics, moist	3	4.0-6.0	SS	3-3-3-1	24
			4	6.0-8.0	SS	3-4-4-1	24
902.50	8.2	Mottled reddish brown & gray sandy clayey silt with fine gravel, moist	5	8.0-10.0	SS	2-3-2-2	24
			6	10.0-12.0	SS	8-7-15-18	24
		3" Fine sand 11.35'-11.65'					
898.70	12.0	Brown - gray sandy clayey silt with gravel (Till) dry	7	12.0-14.0	SS	12-16-20-22	24
			8	14.0-16.0	SS	5-10-20-26	24
			9	16.0-16.0	SS	10-13-20-25	24
			10	18.0-20.0	SS	13-14-14-15	24
			11	20.0-22.0	SS	7-10-12-12	24
			12	22.0-24.0	SS	4-9-10-14	24
			13	24.0-26.0	SS	8-10-12-14	24
			14	26.0-28.0	SS	9-14-20-50	24
883.50	27.2	Gray silty fine - coarse sand & gravel, wet	15	28.0-30.0	SS	27-30-34-37	24
			16	30.0-32.0	SS	16-36-50/6"	18

Dates Drilled: 4/29/87 - 4/30/87

Driller: Earl Dye

Water Depth: Initial:

Note: 300 lb. hammer used.

Days after Completion:

Days after Completion:

Drilling Method: 3-1/4" I.D. Hollow Stem Augers

S&ME, INC.

Cincinnati, Ohio

RECORD OF BORING NO. B-512 & MP-269

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 2 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
878.80	31.9	Gray sandy clayey silt with gravel (Till), dry	17	32.0-34.0	SS	30-48-44-50	24
			18	34.0-36.0	SS	27-50/6"	12
			19	36.0-38.0	SS	50/6"	6
			20	38.0-40.0	SS	30-50/6"	12
			21	40.0-42.0	SS	29-46-50/6"	18
			22	42.0-44.0	SS	31-42-40-50	22
			23	44.0-46.0	SS	20-27-32-50	24
			24	46.0-48.0	SS	10-16-30-40	24
862.70	48.0		25	48.0-50.0	SS	50/4"	4
		Gray weathered shale and limestone					
861.40	49.3	Gray limestone and shale interbedded	26	49.3-51.3	Core	N/A	12
			27	51.3-59.3	Core	N/A	96
851.40	59.3	Boring terminated @ 59'3"					

Dates Drilled: 4-29-30-87

Driller: Earl Dye

Water Depth: Initial:

Days after Completion: Note: 300lb hammer used

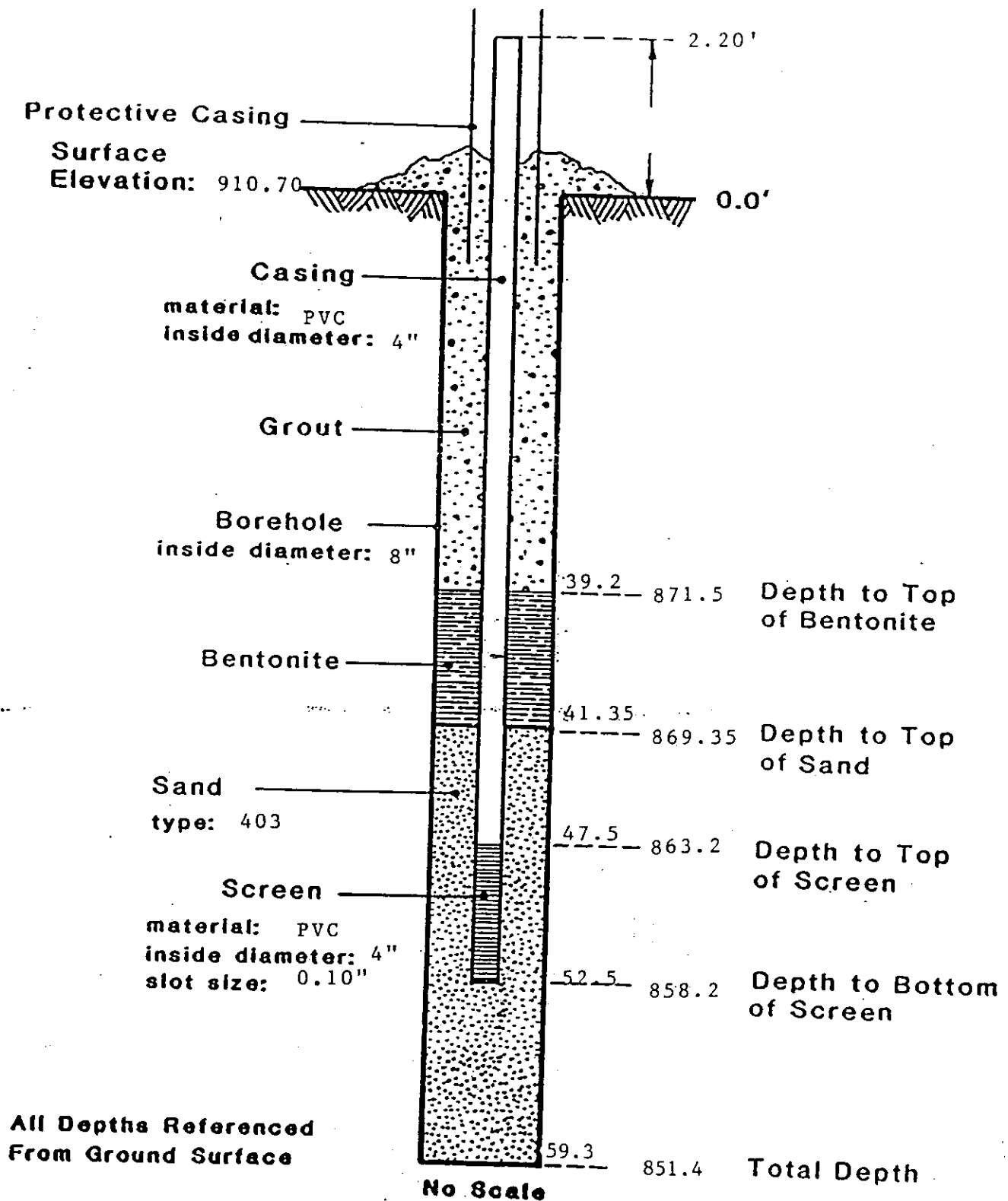
Days after Completion:

S&ME, INC.

Drilling Method: 3 1/4" I.D. Hollow Stem Augers

Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. B-512 & MP-269



CECOS International
Hydrogeological Investigation of Cells
16-27
May 1, 1987
1221-87-194

SOIL & MATERIAL ENGINEERS INC.
CINCINNATI, OHIO

RECORD OF BORING NO.

MP-269A

Client: Cecos International

Page: 1 of 1

Project: Hydrogeological Investigation of Cells 16-27

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
910.70	0.0	Augering with no sampling					
894.70	16.0	Gray sandy clayey silt with gravel (Till) 1" sand 27.9'-28.0'	1	16.0-18.0	SS	2-12-20-20	24
			2	18.0-20.0	SS	10-20-14-17	24
			3	20.0-22.0	SS	7-13-15-19	24
			4	22.0-24.0	SS	4-8-15-20	19
			5	24.0-26.0	SS	6-9-14-16	24
			6	26.0-28.0	SS	6-10-14-20	24
			7	28.0-30.0	SS	20-50/6	12
881.40	29.3	Gray silty fine-coarse sand and gravel, wet	8	30.0-32.0	SS	7-20-50/6	18
878.90	31.8						
		Gray sandy clayey silt with gravel, (Till) moist	9	32.0-34.0	SS	40-46-50/6"	18
			10	34.0-36.0	SS	43-50/6	12
874.70	36.0	Boring terminated @ 36.0'					

Dates Drilled: 5-1-87

Driller: Earl Dye

Water Depth: Initial:

Note: 300lb hammer used

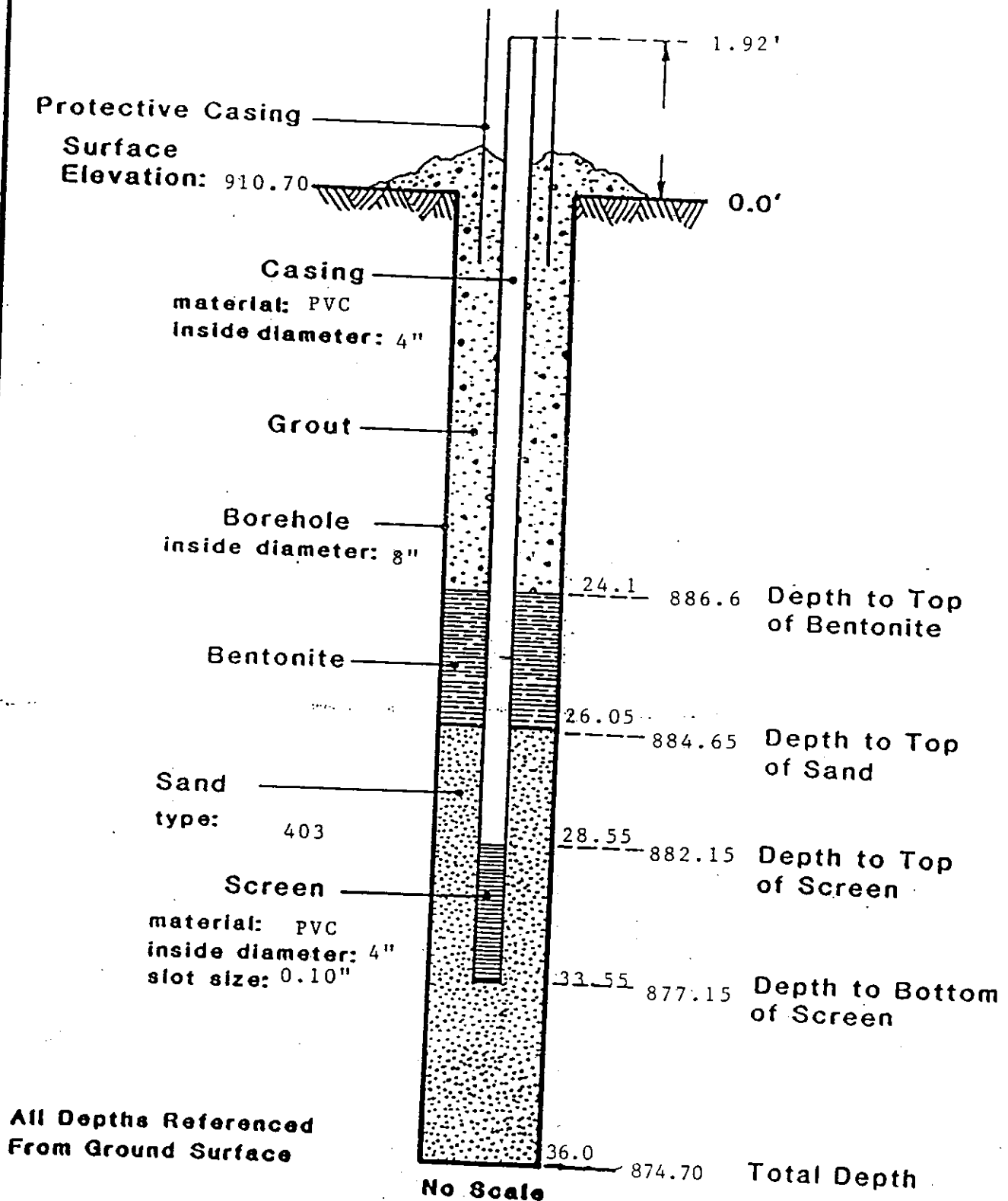
Days after Completion:

Days after Completion:

Drilling Method: 3 1/4" I.D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. B-512A & MP-269A



CECOS International
Hydrogeological Investigation of Cells
16-27
May 4, 1987
1221-87-194

SOIL & MATERIAL ENGINEERS INC.
CINCINNATI, OHIO

RECORD OF BORING NO. B-514 & MP-270

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 1 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
910.20	0.0	Gray sandy silty clay with organics, moist	1	0.0-2.0	SS	2-1-1-1	19
			2	2.0-4.0	SS	2-3-1-5	24
907.3	2.9	Mottled brown and gray slightly sandy silty clay with organics, moist	3	4.0-6.0	SS	9-9-10-14	6
903.9	6.3	Mottled brown and gray sandy silty clay, organics trace fine gravel, moist	4	6.0-8.0	SS	1-4-6-6	22
			5	8.0-10.0	SS	1-1-3-1	18
902.0	8.2	Reddish brown fine sandy silt with fine gravel, dry					
900.0	10.2	Gray sandy clayey silt with fine-coarse gravel and occasional cobble	6	10.0-12.0	SS	20-35-40-36	24
			7	12.0-14.0	SS	23-45-60-50	24
			8	14.0-16.0	SS	46-57-54-82	18
			9	16.0-18.0	SS	47-49-54-71	24
			10	18.0-20.0	SS	46-57-54-83	24
			11	20.0-22.0	SS	34-47-54-60	24
			12	22.0-24.0	SS	26-29-34-50	24
			13	24.0-26.0	SS	28-24-54-70	24
882.70	27.5	Brown fine-coarse silty sand, wet (fine gravel at 30'-33')	14	26.0-28.0	SS	16-28-60-58	23
			15	28.0-30.0	SS	16-24-30-50	18
			16	30.0-32.0	SS	6-13-15-25	24
			17	32.0-34.0	SS	12-25-44-73	24

Dates Drilled: 4/25/87

Driller: Earl Dye

Water Depth: Initial: 14.6'

Note: 300 lb. hammer used

Days after Completion:

Days after Completion:

Drilling Method: 3 1/4" I.D. Hollow stem augers

S&ME, INC.
Cincinnati, Ohio

RECORD OF BORING NO. B-514 & MP-270

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 2 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
877.4	32.8		18	34.0-36.0	SS	50-60-79-105	17
		Gray clayey silt with	19	36.0-38.0	SS	57-100/1"	7
		gravel (gray Till)	20	38.0-40.0	SS	55-100/6"	12
870.2	40.0						
		Gray sandy clayey silt with	21	40.0-42.0	SS	100-100/6"	12
		gravel (gray Till)	22	42.0-44.0	SS	66-90-100/6"	18
			23	44.0-46.0	SS	55-70-100/6"	18
			24	46.0-50.0	SS	70-100/6"	12
			25	48.0-50.0	SS	66-77-100/6"	18
			26	50.0-52.0	SS	55-70-100/6"	18
			27	52.0-54.0	SS	34-70-100/6"	12
			28	54.0-56.0	SS	59-70-80-120	24
			29	56.0-58.0	SS	100/6"	6
			30	58.0-60.0		100/6"	6
852.2	58.0						
		Gray interbedded shale and	31	58.0-630	NX	N/A	60
		limestone					
			32	63.0-68.0	NX	N/A	52
842.2	68.0	Boring terminated @ 68.0'					

Dates Drilled: 4/25/87

Driller: Earl Dye

Water Depth: Initial: 14.6"

Note: 300 lb. hammer used

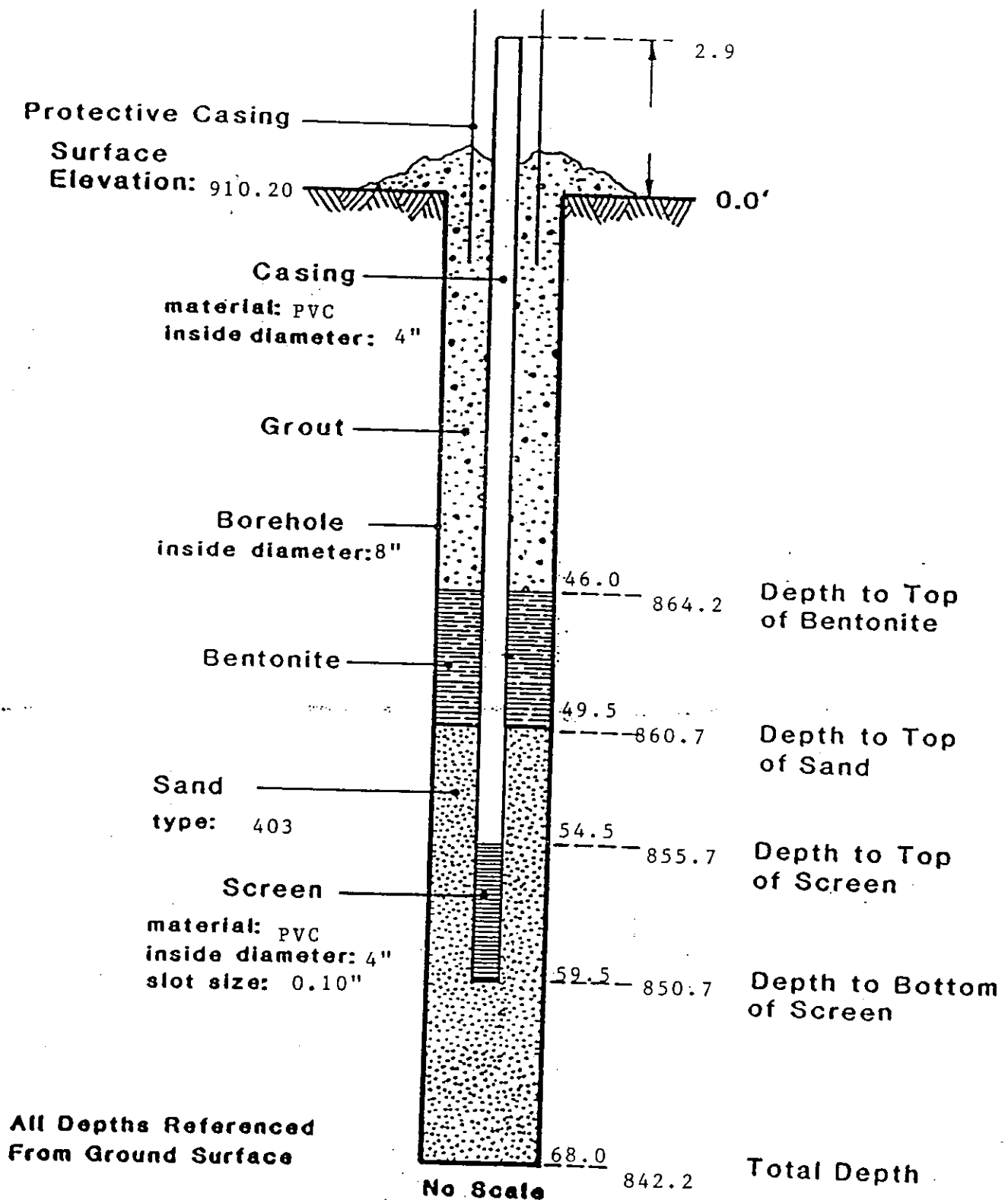
Days after Completion:

Days after Completion:

Drilling Method: 3 1/4" I.D Hollow stem augers

S&ME, INC.
Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. B-514 & MP-270



CECOS International
 Hydrogeological Investigation of Cells
 16-27
 April 27, 1987
 1221-87-194

SOIL & MATERIAL ENGINEERS INC.
 CINCINNATI, OHIO

RECORD OF BORING NO.

B-507 & MP-271

Client: Cecos International

Page: 1 of 3

Project: Hydrogeological Investigation of Cells 16-27

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
912.60	0.0	Topsoil brown clayey silt with organics, dry	1	0.0-2.0	SS	1-2-2-1	24
910.60	2.0	Mottled brown & gray silty clay with organics, moist	2	2.0-4.0	SS	1-2-1-2	18
908.60	4.0	Mottled brown & gray sandy silty clay with organics, moist	3	4.0-6.0	SS	4-5-5-5	22
			4	6.0-8.0	SS	5-6-6-6	22
			5	8.0-10.0	SS	7-5-4-4	24
901.60	11.0	Brown sandy clayey silt with gravel (Till), dry	6	10.0-12.0	SS	1-2-6-17	24
			7	12.0-14.0	SS	23-64/6"	12
			8	14.0-16.0	SS	12-26-46-34	24
		2" fine sand @ 15.2'-15.4'	9	16.0-18.0	SS	13-23-31-43	24
			10	18.0-20.0	SS	50/5.5"	5
		4" fine sand @ 16.0'-16.4'	11	20.0-22.0	SS	16-30-52-66/5"	23
891.90	20.7	Brown silty fine-medium sand, trace gravel, wet					
890.50	22.1	Grey sandy clayey silt with gravel (Till)	12	22.0-24.0	SS	25-72/6"	12
			13	24.0-26.0	SS	25-100/6"	12
			14	26.0-28.0	SS	28-97/6"	12
			15	28.0-30.0	SS	20-49-50/3"	15
			16	30.0-32.0	SS	27-53/6"	12

Dates Drilled: 4/30/87-5/1/87

Driller: BERNIE GOLLIHUE

Water Depth: Initial:

Days after Completion: Note: 300lb hammer used

Days after Completion:

Drilling Method: 3 1/8" I.D. Hollow Stem Augers

S&ME, INC.

Cincinnati, Ohio

RECORD OF BORING NO. B-507 & MP-271

Client: Cecos International

Page: 2 of 3

Project: Hydrogeological Investigation of Cells 16-27

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
		Grey sandy clayey silt with gravel, dry, (Till)	17	32.0-34.0	SS	40-76/6"	12
			18	34.0-36.0	SS	23-47-68-75	24
			19	36.0-38.0	SS	14-34-44-70	24
		2" sand & gravel @ 36.8'- 37.0'	20	38.0-40.0	SS	14-20-31-33	24
			21	40.0-42.0	SS	7-14-19-26	24
			22	42.0-44.0	SS	13-20-25-30	24
			23	44.0-46.0	SS	7-14-26-35	24
			24	46.0-48.0	SS	18-28-48-56	24
			25	48.0-50.0	SS	13-20-33-64	24
			26	50.0-52.0	SS	9-18-27-30	24
			27	52.0-54.0	SS	14-23-32-47	24
			28	54.0-56.0	SS	13-24-38-38	24
			29	56.0-58.0	SS	3-9-15-30	18
			30	58.0-60.0	SS	7-15-16-35	24
			31	60.0-62.0	SS	12-24-30-88/3"	21
			32	62.0-64.0	SS	7-20-24-32	24
			33	64.0-66.0	SS	7-20-31-38	24
			34	66.0-68.0	SS	7-15-24-30	24
844.60	68.0	Gray clayey silt with gravel, organic, moist	35	68.0-70.0	SS	5-9-12-15	24
			36	70.0-72.0	SS	8-9-61-55/1"	19
841.20	71.4	Gray weathered shale & clayey silt with gravel	37	72.0-74.0	SS	75/1"	1

Dates Drilled: 4/30/87-5/1/87

Driller: Bernie Gollihue

Water Depth: Initial:

Days after Completion: Note: 300lb hammer used

Days after Completion:

S&ME, INC.

Drilling Method: 3 1/8" I.D. Hollow Stem Augers

Cincinnati, Ohio

RECORD OF BORING NO. B-507 & MP-271

Client: Cecos International

Page: 3 of 3

Project: Hydrogeological Investigation of Cells 16-27

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
840.60	72.0	Interbedded gray shale and limestone	38	72.0-82.0	N/X	N/A	120
830.60	82.0	Boring terminated @ 82.0'					

Dates Drilled: 5/1/87

Driller: Bernie Gullihue

Water Depth: Initial:

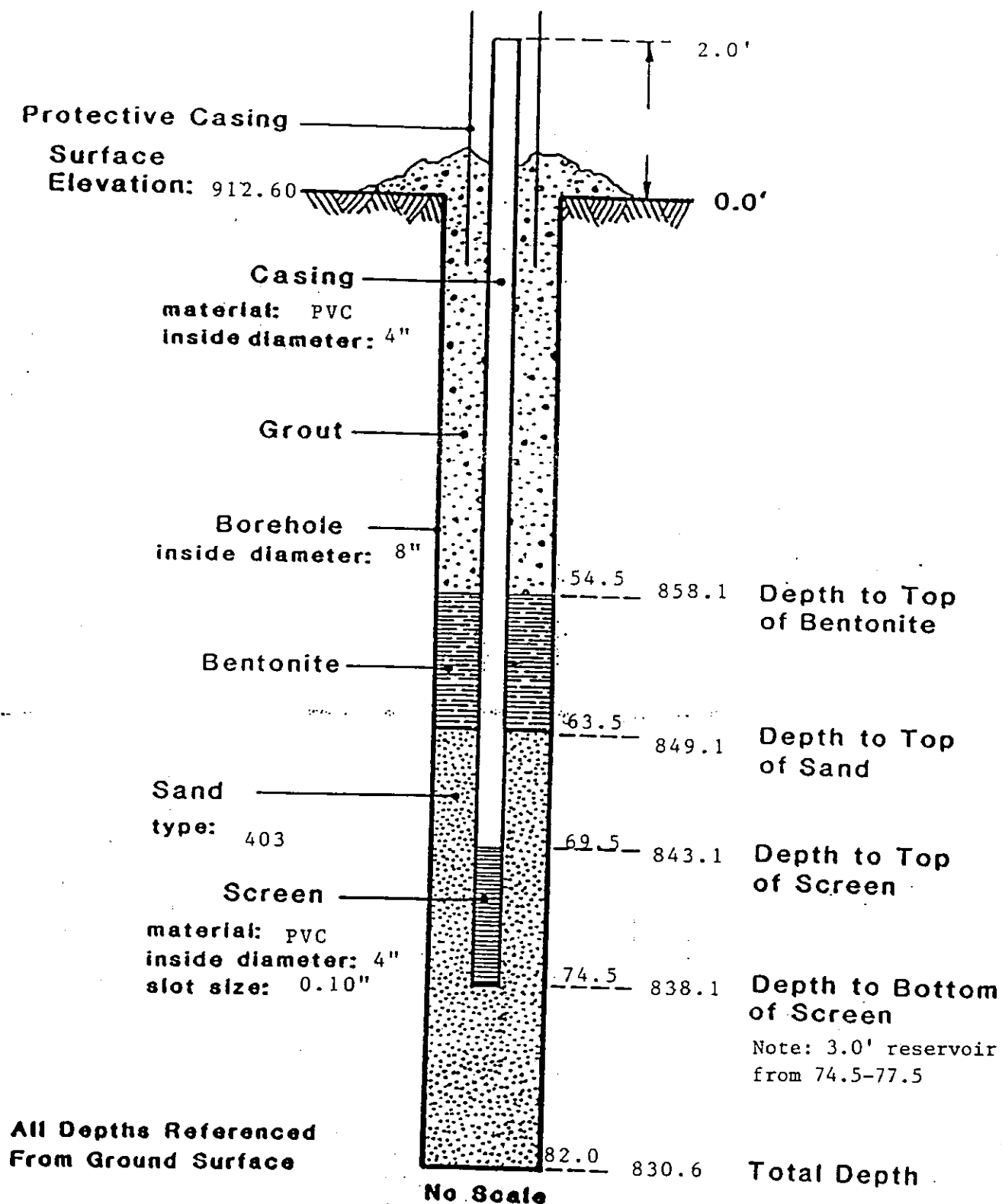
Days after Completion:

Days after Completion:

Drilling Method: 3 1/8" I.D. Hollow Stem Augers & 3" NX Rock Core

S&ME, INC.
Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. B-507 & MP-271



CECOS International
Hydrogeological Investigation of Cells
16-27
May 5, 1987
1221-87-194

SOIL & MATERIAL ENGINEERS INC.
CINCINNATI, OHIO

RECORD OF BORING NO. MP-271A

Client: Cecos International

Page: 1 of 1

Project: Hydrogeological Investigation of Cells 16-27

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
912.60	0.0	Augered with no sampling					
886.6	26.0	Gray sandy clayey silt with gravel (Till)	1 2	26.0-28.0 28.0-30.0	SS SS	60-80/5" 14-45-90/6"	18
881.5	31.1	Gray fine sandy silt grading to: Gray silty fine sand, wet	3 4 5	30.0-32.0 32.0-34.0 34.0-36.0	SS SS SS	9-26-34-31 23-50-91/6" 19-45-45-44	24 18 24
880.7	31.9	Gray sandy silty clay with gravel (Till)					
876.3	36.3	Gray fine-coarse sand & gravel	6	36.0-38.0	SS	3-22-42-34	24
876.1	36.5	Gray sandy silty clay with gravel (Till)	7 8	38.0-40.0 40.0-42.0	SS SS	12-19-22-24 7-20-20-26	24 24
		1" fine-coarse sand & gravel @ 37.8'					
870.6	42.0	Boring terminated @ 42.0'					

Dates Drilled: 5/5/87

Driller: Bernie Gollihue

Water Depth: Initial: 31'

Days after Completion: Note: 300lb hammer used

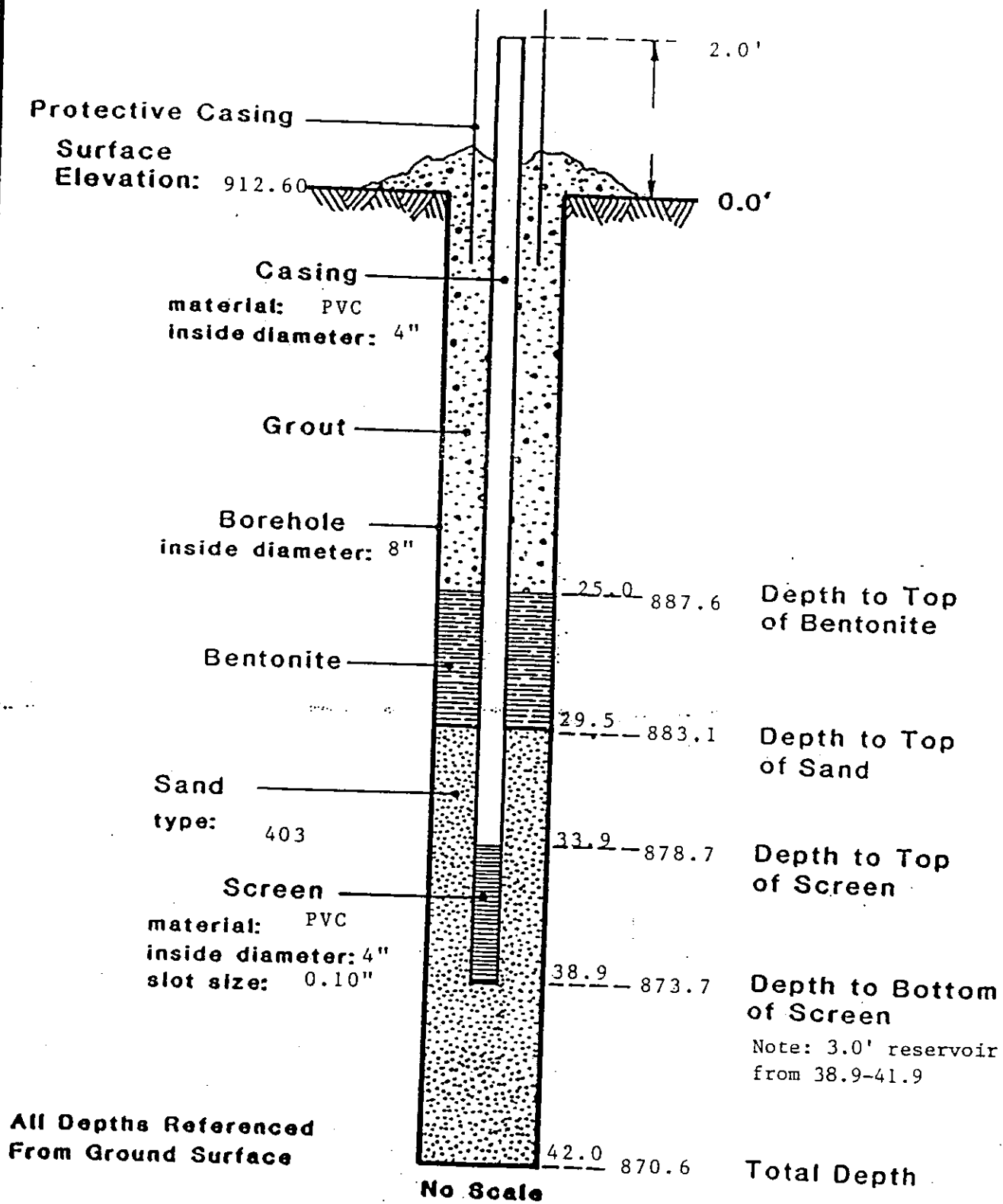
Days after Completion:

S&ME, INC.

Drilling Method: 3 1/8" I.D. Hollow Stem Augers

Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. B-507A & MP-271A



CECOS International
Hydrogeological Investigation of Cells
16-27
May 7, 1987
1221-87-194

SOIL & MATERIAL ENGINEERS INC.
CINCINNATI, OHIO

RECORD OF BORING NO. B-502 & MP-272

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 1 of 3

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
913.37	0.0	Topsoil, brown clayey silt	1	0.0-2.0	SS	7-5-3-5	6
911.37	2.0	Mottled brown & gray silty clay, moist	2	2.0-4.0	SS	2-2-1-1	24
906.87	6.5		3	4.0-6.0	SS	3-2-2-1	20
		Gray sandy, silty clay with gravel, moist (Till)	4	6.0-8.0	SS	1-2-8-13	24
			5	8.0-10.0	SS	8-14-16-16	24
			6	10.0-12.0	SS	6-9-8-12	
			7	12.0-14.0	SS	10-10-16-15	19
			8	14.0-16.0	SS	6-8-10-14	24
		6" silty fine-coarse sand & gravel, wet at 16.0'	9	16.0-18.0	SS	3-11-14-16	24
			10	18.0-20.0	SS	7-8-11-12	24
			11	20.0-22.0	SS	6-16-21-23	24
			12	22.0-24.0	SS	16-16-18-14	24
			13	24.0-26.0	SS	6-10-21-61	20
		3" silty fine-medium sand, wet @26.7'	14	26.0-28.0	SS	19-19-21-34	24
			15	28.0-30.0	SS	13-19-23-28	24
883.37	30.0	Brown silty fine-coarse sand with fine gravel, wet	16	30.0-32.0	SS	6-14-31-34	24
			17	32.0-34.0	SS	3-4-3-3	24
		8" brown sandy silty clay with gravel (Till) @ 31.4'					

Dates Drilled: 4/29/87 to 5/10/87

Driller: Dave Newman

Water Depth: Initial:

Days after Completion: Note: 380lb hammer used

Days after Completion:

Drilling Method: 3 1/8" I.D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

RECORD OF BORING NO.

B-502 & MP-272

Client: Cecos International

Page: 2 of 3

Project: Hydrogeological Investigation of Cells 16-27

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
879.37	34.0	Gray sandy clayey silt with gravel (Till), moist	18	34.0-36.0	SS	2-17-36-47	24
			19	36.0-38.0	SS	25-52-49-110	24
			20	38.0-40.0	SS	19-18-26-32	24
			21	40.0-42.0	SS	10-18-24-26	6
			22	42.0-44.0	SS	11-14-17-24	24
			23	44.0-46.0	SS	9-10-11-17	24
			24	46.0-48.0	SS	5-11-14-24	24
			25	48.0-50.0	SS	7-8-13-15	24
			26	50.0-52.0	SS	5-10-10-14	24
			27	52.0-54.0	SS	8-10-15-22	24
			28	54.0-56.0	SS	9-11-73-50	20
			29	56.0-58.0	SS	6-9-14-26	0
			30	58.0-60.0	SS	6-9-13-16	24
			31	60.0-62.0	SS	4-10-13-16	24
			32	62.0-64.0	SS	8-11-16-28	24
			33	64.0-66.0	SS	9-14-17-24	24
			34	66.0-68.0	SS	3-7-14-25	20
		4" silty fine sand, wet @ 69.0'	35	68.0-70.0	SS	8-21-25-33	24
			36	70.0-72.0	SS	7-8-10-19	24
			37	72.0-74.0	SS	8-14-17-24	24
			38	74.0-76.0	SS	5-9-14-21	24
			39	76.0-78.0	SS	3-11-13-23	24
			40	78.0-80.0	SS	3-11-13-23	6
			41	80.0-82.0	SS	4-6-9-16	24
			42	82.0-84.0	SS	7-8-12-22	24
			43	84.0-86.0	SS	4-8-12-16	24
			44	86.0-88.0	SS	3-5-9-11	24
			45	88.0-90.0	SS	3-5-8-12	4

Dates Drilled: 4/29/87 - 5/10/87

Driller: Dave Newman

Water Depth: Initial:

Days after Completion: Note: 380lb hammer used

Days after Completion:

S&ME, INC.

Drilling Method: 3 1/8" I.D. Hollow Stem Augers

Cincinnati, Ohio

RECORD OF BORING NO.

B-502 & MP-272

Client: Cecos International

Page: 3 of 3

Project: Hydrogeological Investigation of Cells 16-27

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
			46	90.0-92.0	SS	4-5-7-10	24
			47	92.0-94.0	SS	6-8-11-13	24
			48	94.0-96.0	SS	4-5-10-13	12
			49	96.0-98.0	SS	3-21-13-16	24
			50	98.0-100.0	SS	4-5-6-12	24
			51	100.0-102.0	SS	4-6-9-16	24
			52	102.0-104.0	SS	4-4-8-42	24
		Large cobble or boulder at 104.0'	53	104.0-106.0	SS	50/1"	0
			54	106.0-108.0	SS	3-3-3-23	24
			55	108.0-110.0	SS	4-4-7-15	24
			56	110.0-112.0	SS	50/1"	1
			57	112.0-114.0	SS	4-6-8-10	24
			58	114.0-116.0	SS	2-4-5-6	24
			59	116.0-118.0	SS	8-8-17-39	24
795.37	118.0	Gray sandy clayey silt with gravel & weathered limestone and shale, (Till)	60	118.0-120.0	SS	10-68-87	12
794.87	118.5	Interbedded gray shale and limestone	61	118.5-128.5	Core	N/A	120
784.87	128.5	Boring terminated @ 128.5'					

Dates Drilled: 4/29/87-5/10/87

Driller: Dave Newman

Water Depth: Initial:

Days after Completion:

Days after Completion:

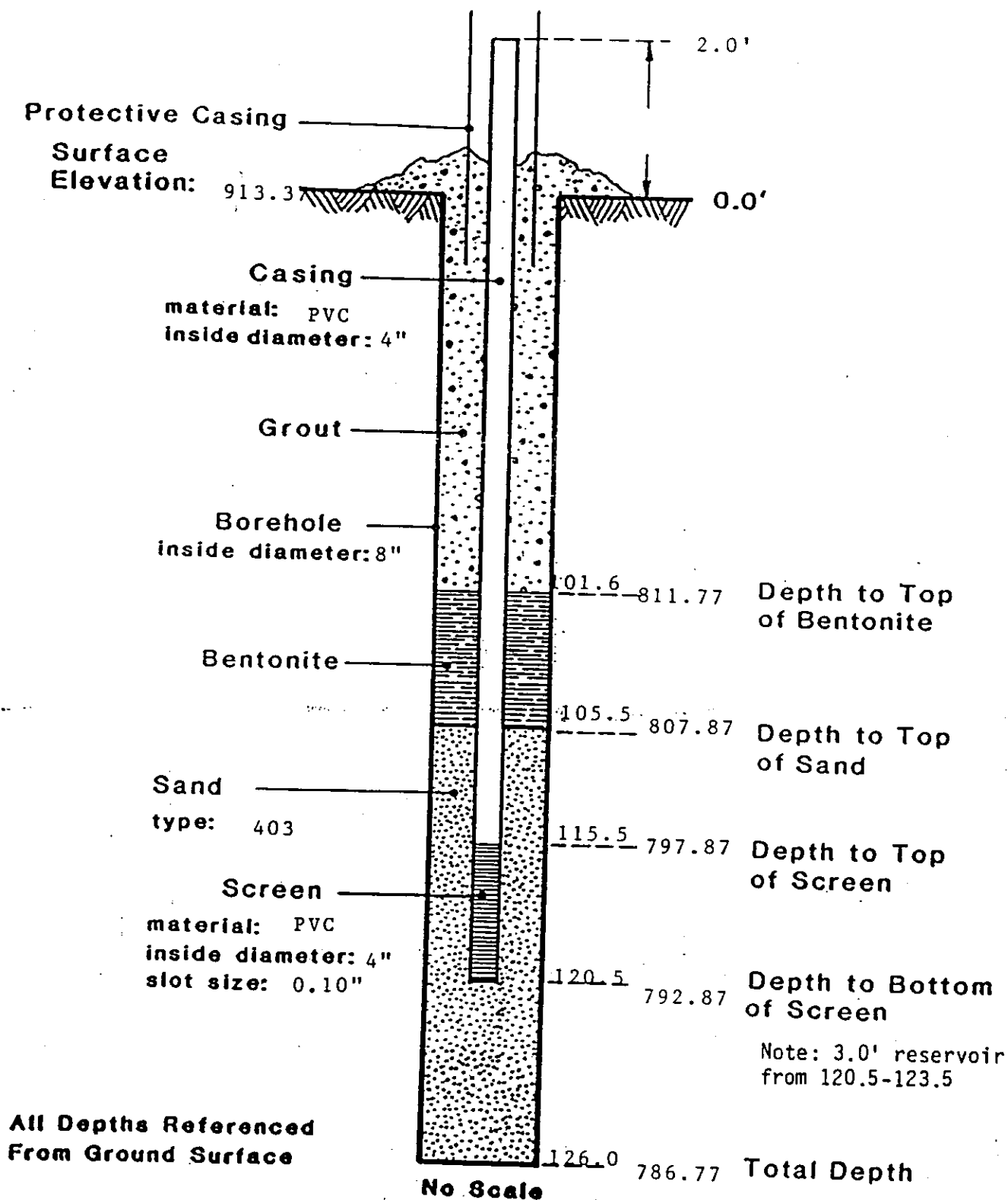
Note: 380lb hammer used

S&ME, INC.

Drilling Method: 3 1/8" I.D Hollow Stem Augers

Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. B-502 & MP-272



CECOS International
Hydrogeological Investigation of Cells
16-27
May, 10, 1987
1221-87-194

SOIL & MATERIAL ENGINEERS INC.
CINCINNATI, OHIO

RECORD OF BORING NO. MP# 272A

Client: Cecos International
Project: Thomas/Luschek Properties
Project No.: 1221-87-194

Page: 1 of 1

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
913.98	0.0						
		Augering with no sampling					
893.98	20.0						
		Gray sandy silty clay with	1	20.0-22.0	SS	35-50/6"	12
		gravel (Till)	2	22.0-24.0	SS	17-20-26-35	24
889.08	24.9						
		Gray silty fine-coarse	3	24.0-26.0	SS	15-22-24-37	24
		sand, wet					
888.68	25.3						
		Gray sandy clayey silt	4	26.0-28.0	SS	22-27-31-39	24
		with gravel (Till)	5	28.0-30.0	SS	20-35-50/6"	18
			6	30.0-32.0	SS	22-25-50/"	
		5" fine-coarse silty sand	7	32.0-34.0	SS	17-25-50/"	
		@ 26.6'					
		3" fine-medium silty sand					
		@ 29.8'					
		1" fine-coarse silty sand					
		@ 33.4'					
879.98	34.0						
		Gray silty fine-coarse sand, 8		34.0-36.0	SS	35-50/	
		wet					
879.58	34.4						
		Gray sandy clayey silt with	9	36.0-38.0	SS	50/	
		gravel, (Till)	10	38.0-40.0	SS	15-26-35-50	
873.93	40.05						
		Boring terminated @ 40.05'					

Dates Drilled: 5/10/87

Driller: Earl Dye

Water Depth: Initial:

Days after Completion: Note: 300lb hammer used

Days after Completion:

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

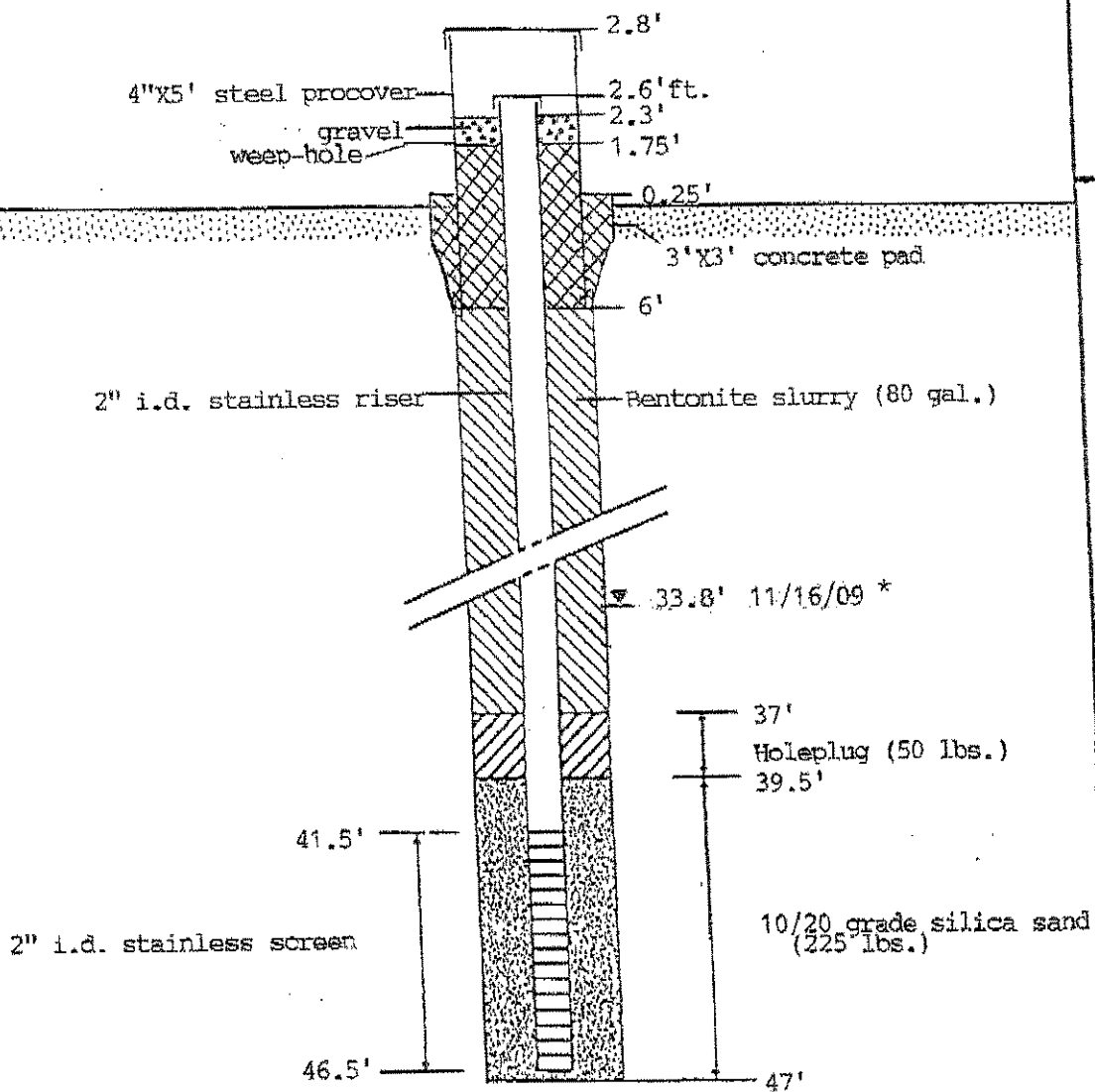
FIELD BORING LOG

Bar. No. 273ARR

Type Drilling HSAWater level after hrs.

* Cobble blocked spoon tip

CFCOS Landfill
Clermont Co., OH

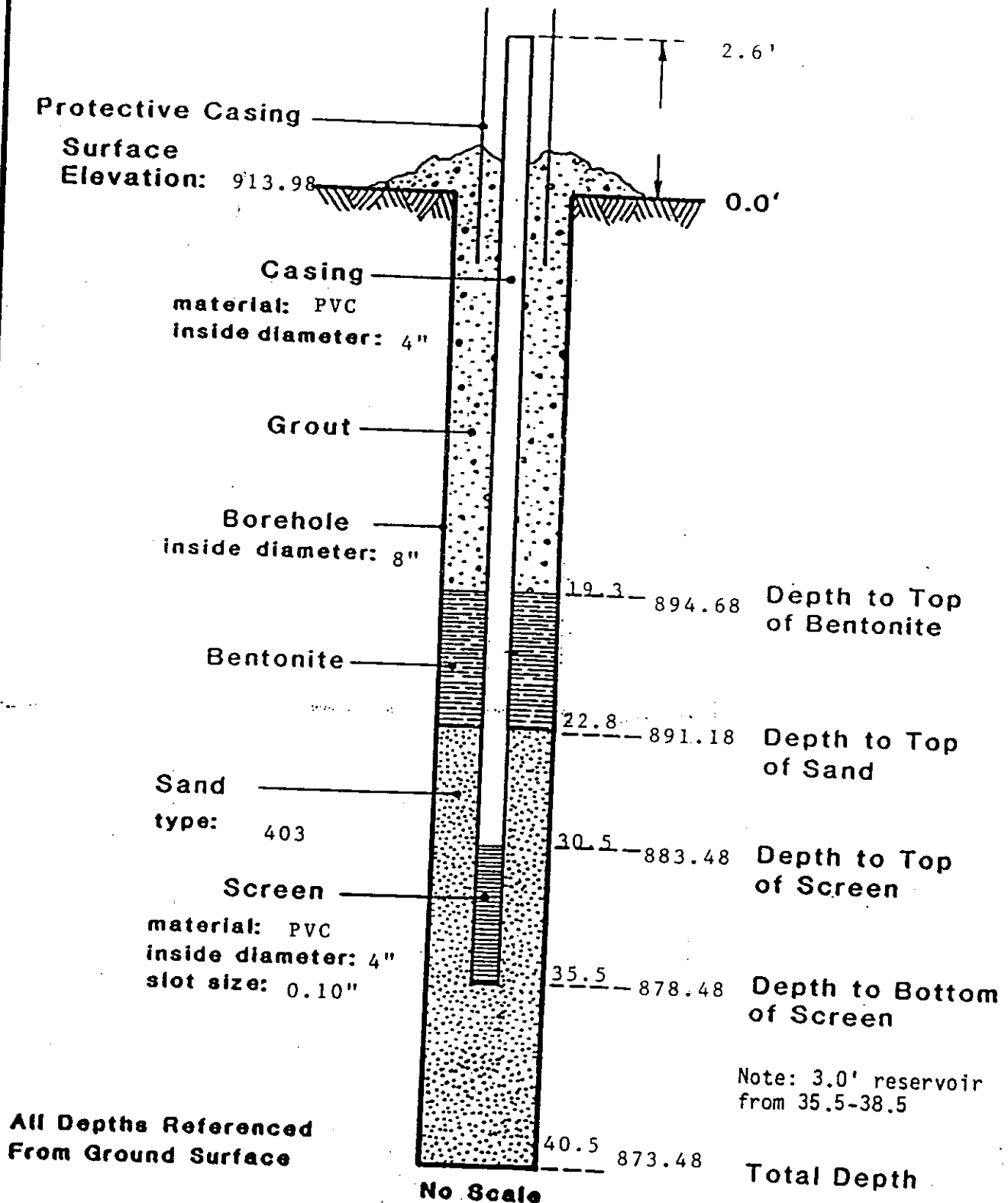


MP-273ARR

* Pre-development SWL

Jersey West Drilling
Nov., 2009

CONSTRUCTION LOG OF WELL NO. B-502A & MP-272A



CECOS International
Hydrogeological Investigation of Cells
16-27
May 10, 1987
1221-87-194

SOIL & MATERIAL ENGINEERS INC.
CINCINNATI, OHIO

RECORD OF BORING NO.

MP-273

(B2)

Client: CECOS International
Project: TSCA Wells Cell #10
Project No.: 1221-87-210

Page: 1 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
	0.0	Augered with no sampling					
	14.0						
		Brown sandy silty clay	1	14.0-16.0	SS	7-14-14-15	0
		with gravel (Till), moist	2	16.0-18.0	SS	5-8-18-14	9
			3	18.0-20.0	SS	2-4-6-9	6
			4	20.0-22.0	SS	3-5-5-6	8
	21.0	Gray sandy clayey silt with gravel (Till), moist (organics @ 23.0') 0.5" coarse sand and gravel, wet @ 27.2' 4" silty fine-coarse sand and gravel, wet @ 43.7' 0.5" sand and gravel, wet @ 48.4'	5	22.0-24.0	SS	2-4-4-8	16
			6	24.0-26.0	SS	4-8-9-12	17
			7	26.0-28.0	SS	1-4-8-16	14
			8	28.0-30.0	SS	7-25-50/4	16
			9	30.0-32.0	SS	7-9-25-38	18
			10	32.0-34.0	SS	4-25-40-50	14
			11	34.0-36.0	SS	7-14-28-39	19
			12	36.0-38.0	SS	15-29-36-48	19
			13	38.0-40.0	SS	10-13-17-25	23
			14	40.0-42.0	SS	9-11-15-16	10
			15	42.0-44.0	SS	10-25-27-50	23
			16	44.0-46.0	SS	35-50/4	8
			17	46.0-48.0	SS	27-50/4	9
			18	48.0-50.0	SS	50/4	4
			19	50.0-52.0	SS	38-50/4	8
			20	52.0-54.0	SS	48-50/4	9
			21	54.0-56.0	SS	39-50/5	11
			22	56.0-58.0	SS	22-37-50/4	14
			23	58.0-60.0	SS	22-42-50/5	17
			24	60.0-62.0	SS	22-42-50/5	17
			25	62.0-64.0	SS	22-32-49-50/5	22
			26	64.0-66.0	SS	22-42-50/5	15
			27	66.0-68.0	SS	21-26-36-50/5	22
			28	68.0-70.0	SS	23-38-48	18
			29	70.0-72.0	SS	22-36-50/7	17
			30	72.0-74.0	SS	26-42-50/5	18
			31	74.0-76.0	SS	13-20-26-32	22
			32	76.0-78.0	SS	15-26-35-50/5	18

Dates Drilled: 6/13-6/14/87

Driller: B. Gollihue

Water Depth: Initial:

NOTE: 300-lb. hammer used

Days after Completion:

Days after Completion:

Drilling Method: 8" I.D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

RECORD OF BORING NO. MP-273 B

Client: CECOS International
Project: TSCA Wells Cell #10
Project No.: 1221-87-210

Page: 2 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
			33	78.0-80.0	SS	26-37-50/4	16
			34	80.0-82.0	SS	15-30-41-50/4	18
			35	82.0-84.0	SS	12-20-27-31	18
			36	84.0-86.0	SS	12-36-50/4	16
	89.0		37	86.0-88.0	SS	19-28-49-50/3	18
		Gray silty clay, organic, moist	38	88.0-90.0	SS	20-29-40-50/3	22
	92.0		39	90.0-92.0	SS	14-50/3	9
		Interbedded gray shale and limestone (bedrock)	40	92.0-101.0	Core	N/A	103
	101.0						
		Boring terminated @ 101.0'					

Dates Drilled: 6/13-6/14/87

Driller: B. Gollihue

Water Depth: Initial:

NOTE: 300-lb. hammer used

Days after Completion:

Days after Completion:

Drilling Method: 8" I.D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

RECORD OF BORING NO. MP-274

Client: CECOS International
Project: TSCA Wells Cell #10
Project No.: 1221-87-210

Page: 1 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
912.9	0.0	Brown-gray sandy silty clay with gravel (Fill)	1	0.0-2.0	SS	2-3-4-3	6
	2.5	Brown sandy silty clay with gravel (Till), dry	2	2.0-4.0	SS	3-5-5-6	22
			3	4.0-6.0	SS	3-3-3-3	24
			4	6.0-8.0	SS	5-5-5-7	22
			5	8.0-10.0	SS	5-7-15-30	24
	10.7	Brown clayey fine-coarse sand, dry	6	10.0-12.0	SS	20-35-50	18
	11.4	Brown fine-coarse sand, dry					
	11.8	Brown sandy, silty clay with gravel (Till), dry					
	13.0	Gray sandy clayey silt with gravel (Till), dry	7	12.0-14.0	SS	2-8-16-22	12
			8	14.0-16.0	SS	17-11-12-21	24
			9	16.0-18.0	SS	1-10-13-20	24
			10	18.0-20.0	SS	8-12-15-13	24
			11	20.0-22.0	SS	6-8-13-15	24
			12	22.0-24.0	SS	7-10-10-14	23
			13	24.0-26.0	SS	25-35-73	18
	26.0	Gray silty fine - medium sand and gravel, moist - limestone float @ 28.0'	14	26.0-28.0	SS	25-35-73	8
			15	28.0-30.0	SS	80/6	6
	28.8	Gray sandy clayey silt with gravel (Till), dry	16	30.0-32.0	SS	30-55	12
	32.9	Gray silty fine sand, moist	17	32.0-34.0	SS	43-53	12

Dates Drilled: 6/10-6/12/87

Driller: B. Collihue

Water Depth: Initial:

NOTE: 300-lb. hammer used

Days after Completion:

Days after Completion:

Drilling Method: 4-1/2" I.D. Hollow Stem Augers

S&ME, INC.

Cincinnati, Ohio

RECORD OF BORING NO. MP-274

Client: CECOS International
Project: TSCA Wells Cell #10
Project No.: 1221-87-210

Page: 2 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
	35.4						
		Gray sandy silty clay with	18	34.0-36.0	SS	63/6	6
		gravel (Till), dry	19	36.0-38.0	SS	12-27-70	18
			20	38.0-40.0	SS	15-35-45-57	24
			21	40.0-42.0	SS	24-26-45-53	24
			22	42.0-44.0	SS	14-28-61	18
	43.5	Gray silty fine-coarse					
		sand, moist					
	44.0						
		Gray sandy silty clay with	23	44.0-46.0	SS	18-27-47-60	24
		gravel (Till), dry	24	46.0-48.0	SS	20-60	12
			25	48.0-50.0	SS	23-40-50	12
			26	50.0-52.0	SS	26-26-32-37	24
			27	52.0-54.0	SS	8-12-18-23	24
			28	54.0-56.0	SS	10-17-28-36	24
	56.0						
		Brownish-gray sandy silty	29	56.0-58.0	SS	13-18-30-23	16
		clay with gravel (Till),	30	58.0-60.0	SS	10-17-21-31	24
		dry	31	60.0-62.0	SS	7-15-18-21	24
			32	62.0-64.0	SS	9-16-26-30	22
	63.6						
		Brown sandy silty clay	33	64.0-66.0	SS	9-15-21-30	15
		with gravel (Till), dry	34	66.0-68.0	SS	8-14-18-16	24
			35	68.0-70.0	SS	35-50/1	7
			36	70.0-70.5	SS	90/5	5
	70.0						
		Interbedded gray limestone	37	70.5-81.5	CORE	N/A	132
		and shale, bedrock					
	81.5						
		Boring terminated @ 81.5'					

Dates Drilled: 6/12/87

Driller: B. Gollihue

Water Depth: Initial:

Days after Completion:

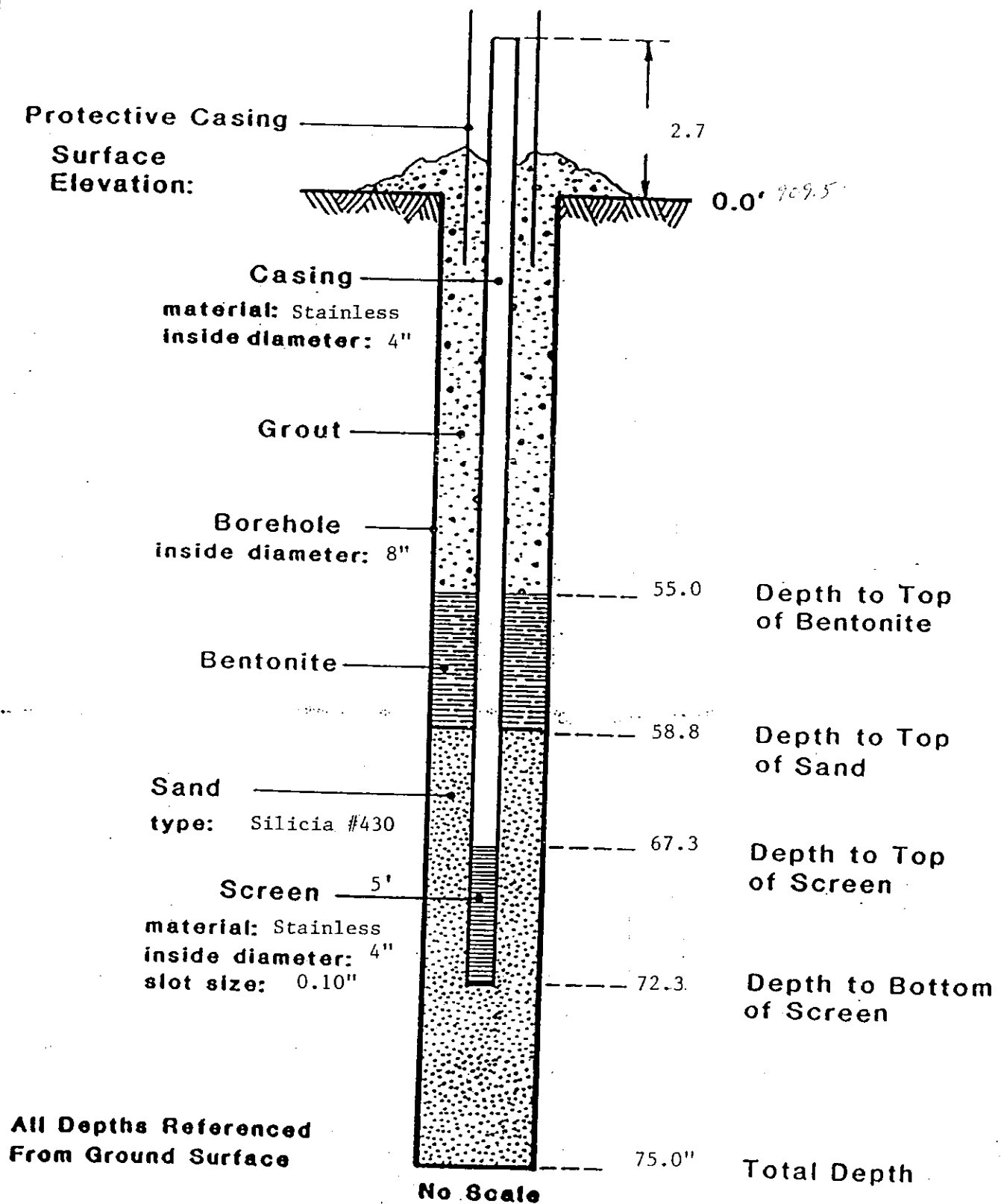
Days after Completion:

S&ME, INC.

Drilling Method: 4-1/2" I.D. Hollow Stem Augers

Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. MP-274



MP-274
TSCA Well Cell #10
6-12-87

1221-87-210

SOIL & MATERIAL ENGINEERS INC.
CINCINNATI, OHIO

RECORD OF BORING NO. MP-274A

Client: CECOS International
Project: TSCA Wells Cell #10
Project No.: 1221-87-210

Page: 1

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
	0.0						
	16.0	Augered with no sampling					
		Mottled brown and gray	1	16.0-18.0	SS	2-12-18-22	24
		sandy silty clay with	2	18.0-20.0	SS	13-18-25-23	10
		gravel (Till), moist					
	19.7						
		Gray sandy clayey silt	3	20.0-22.0	SS	9-10-11-14	18
		with gravel (Till), dry	4	22.0-24.0	SS	6-8-8-10	24
			5	24.0-26.0	SS	7-8-9-10	20
	26.1						
		Gray silty fine-coarse	6	26.0-28.0	SS	20-60/4	8
		sand and gravel, moist					
	29.0						
		Gray sandy clayey silt	7	28.0-30.0	SS	28-50/2	8
		with gravel (Till), dry	8	30.0-32.0	SS	15-25-50/4	16
			9	32.0-34.0	SS	29-55/5	11
	34.0						
		Gray silty fine sand, moist	10	34.0-36.0	SS	32-60/4	9
	36.0						
		Gray sandy silty clay with	11	36.0-38.0	SS	32-36-38-45	20
		gravel (Till), dry					
	38.0						
		Boring terminated @ 38.0'					

Dates Drilled: 6/13/87

Driller: B. Gollohue

Water Depth: Initial:

NOTE: 300-lb. hammer used

Days after Completion:

Days after Completion:

Drilling Method: 4-1/2" I.D. Hollow Stem Augers

S&ME, INC.

Cincinnati, Ohio

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Ground Water Associates, Inc.

CONSULTING HYDROGEOLOGISTS

6 1/2 N. STATE STREET
WESTERVILLE, OHIO 43081

JOB NO 321-092

BORE HOLE NO MP-275

PROJECT CECOS, Aber Road		LOCATION N 6032.0 E 5795.0 Geier	
DRILLING CONTRACTOR Pennsylvania Drilling		DRILLING EQUIPMENT Mobile 80, Hollow Stem Auger	
GWA HYDROGEOLOGIST Kathryn Epp		DRILLER Earl Dye	
DATE START / TIME 6/10/87 1145 hrs.	DATE FINISH / TIME 6/10/87 1800 hrs.	SURFACE ELEVATION 909.2 ft. msl	TOTAL DEPTH 36.4 ft.
WELL CASING 4" ID PVC	SCREEN TYPE 4" ID PVC	LENGTH 5.0'	SLOT 0.010"

GROUND WATER					CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	WEATHER	TYPE			split spoon	
6/11/87	0830	25.5' below grade		DIAMETER			2" OD	
6/18/87		28.58	PVC	HAMMER WEIGHT			300 lbs	
				FALL			30"	

REMARKS
Top of PVC elevation 911.79 ft. msl

DEPTH (FT.)	SAMPLE NO	BLOW COUNT PER 6 IN.	RECOVERY (IN.)	BORE HOLE LOG		GRAPHIC LOG
				LITHOLOGIC DESCRIPTION	REMARKS	
2	1	0,1 1,1	12	Topsoil, light brown clayey sandy silt	PID = Background (0.2-0.3 ppm) for all samples	
4	2	—	24	Mottled orange-brown clayey silt and gray silty clay, trace sand		
6	3	2,4, 3,6	24			
8	4	4,5, 6,6	24			
10	5	12,14, 22,27	24	"Till" Brown clayey silt/silty clay trace to little fine-coarse sand, fine-medium gravel, dry, hard grades to brownish gray in color		
12	6	15,22, 29,39	24			
14	7	9,17, 19,29	24			
16	8	10,18, 20,30	24			
18	9	10,12, 20,38	24			
20	10	11,14, 16,20	24	18.5-18.8' little to some sand (damp)		
22	11	8,19, 16,21	24	20-20.1' moist sandy clayey silt		
24	12	6,7, 10,12	24			



Ground Water Associates, Inc.
CONSULTING HYDROGEOLOGISTS
6 1/2 N. STATE STREET
WESTERVILLE, OHIO 43081

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JOB NO 321-092

BORE HOLE NO MP-275

PROJECT CECOS, Aber Road

LOCATION N 6032.0 E 5795.0 Geier

REMARKS

DEPTH (FT.)	SAMPLE NR	BLOW COUNT PER 6 IN.	RECOVERY (IN.)	LITHOLOGIC DESCRIPTION	REMARKS	GRAPHIC LOG
26	13	6,8, 10,13	24	"Till Brownish gray to green clayey silt, trace to little sand to coarse gravel, slightly damp, dense, 1/4" sand seam at 15.5' (wet)		
28	14	9,10, 12,18	24			
30	15	4,7, 12,12	24			
32	16	8,12, 14,15	24			
34	17	8,13, 23,42	24	SAND - very fine to coarse, some fine to coarse gravel, trace silt, saturated, gray	32-33.2'	
36	18	30,50	10	"Till" - Brownish gray clayey SILT gravelly, sandy, dense to very hard		
	19	50/5	5			
				Augered to 36.0 ft Sampled to 36.4 ft	screen set 29.5 to 34.8 feet below ground	

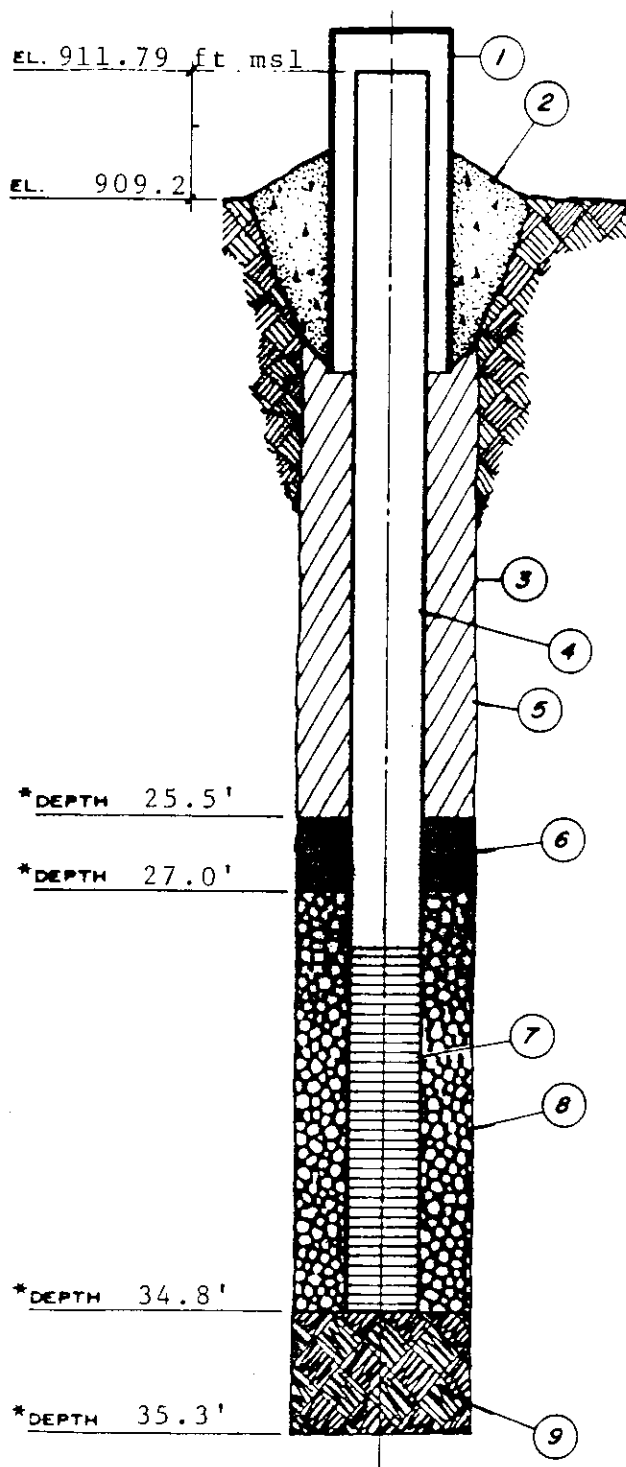
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MONITOR WELL COMPLETION REPORT :

WELL N^o MP 275 JOB N^o 321-092

PROJECT CECOS, Aber Road

6/11/87



1. PROTECTIVE CASING I.D. 6 INCHES.

2. SURFACE SEAL TYPE Concrete

3. BOREHOLE DIAMETER 10 INCHES.

4. RISER PIPE:

a. Type Schedule 40 PVC

b. I.D. 4 INCHES

c. Length 32.5 FEET

d. Joint Type Flush Thread

5. BACKFILL:

a. Type 5% bentonite grout

b. Installation side discharge tremie

6. Type of SEAL 1/4" bentonite pellets

7. SCREEN

a. Type Schedule 40 PVC

b. I.D. 4" INCHES

c. Slot Size 0.010 INCHES

d. Length 5 FEET

8. SCREEN FILTER TYPE #5 silica sand

9. BACKFILL TYPE #5 silica sand

*all depths measured from ground surface.

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Ground Water Associates, Inc.
CONSULTING HYDROGEOLOGISTS
6 1/2 N. STATE STREET
WESTERVILLE, OHIO 43081

JOB NO
321-092

BORE HOLE NO
MP 276

PROJECT CECOS, Aber Road		LOCATION N 6193.7 E 5341 Geier	
DRILLING CONTRACTOR Pennsylvania Drilling		DRILLING EQUIPMENT Mobile 80, Hollow Stem Auger	
GWA HYDROGEOLOGIST David P. Silbaugh		DRILLER Earl Dye	
DATE START / TIME 6/12/87 - 0730 hrs	DATE FINISH / TIME 6/14/87 - 1500 hrs	SURFACE ELEVATION 904.9 ft. msl	TOTAL DEPTH 35.5'
WELL CASING 4" ID PVC	SCREEN TYPE 4" ID PVC	LENGTH 5.0'	SLOT 0.010"

GROUND WATER				CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	WEATHER	TYPE		split spoon	
6/13/87	0830	10.8' below grade,		DIAMETER		2" OD	
		inside open hole		HAMMER WEIGHT		300 lbs	
6/18/87		23.76	PVC	FALL		30"	

REMARKS
Top of PVC elevation 906.85 ft. msl

DEPTH (FT.)	SAMPLE NO	BLOW COUNT PER 6 IN.	RECOVERY (IN.)	BORE HOLE LOG		GRAPHIC LOG
				LITHOLOGIC DESCRIPTION	REMARKS	
	1	2,4, 4,4	12	TOPSOIL, light brown, silty clay, moist.	PID = background for all samples (0.2-0.3 ppm)	
2	2	2,7, 7,9	20	SILTY CLAY, mottled light brown and light gray, fine sand and organic matter common, moist, stiff.		
4	3	8,10, 11,12	20	SANDY CLAY, orangish tan 4'-5', gray 5'-6', mottled gray and brown 6'-7', fine to coarse grained sand, moist, stiff.		
6	4	7,10, 29,36	24	Weathered Brown TILL, silty, gravel up to 1", limestone rock fragments common, moist, hard, mottled gray and brown 8'-9.5'.		
8	5	15,41, 60/6'	18			
10	6	26, 50/4'	10			
12	7	24,26, 31,34	24	GRAY TILL, silty, gravel up to 1/2", moist, hard.		
14	8	17,19, 23,33	24			
16	9	19,19, 23,43	24			
18						
20	10	13,16, 21,33	24	fine to coarse grained sand parting at 19.6', wet.	Bottom of sampler wet at 20'	
22	11	19,23, 37,53	20	SAND, fine grained, gray, loose, wet, 20.8'-21.4'		
	12	6,10, 15,23	22	GRAY TILL, silty, gravel up to 3/8", moist, hard. 22.5'-22.6' SAND, coarse grained, loose, wet.	coarse grained sand parting at 23.5'	



Ground Water Associates, Inc.
CONSULTING HYDROGEOLOGISTS
6 1/2 N. STATE STREET
WESTERVILLE, OHIO 43081

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JOB NO 321-092

BORE HOLE NO MP 276

PROJECT CECOS, Aber Road

LOCATION Geier property north of cell 2

REMARKS

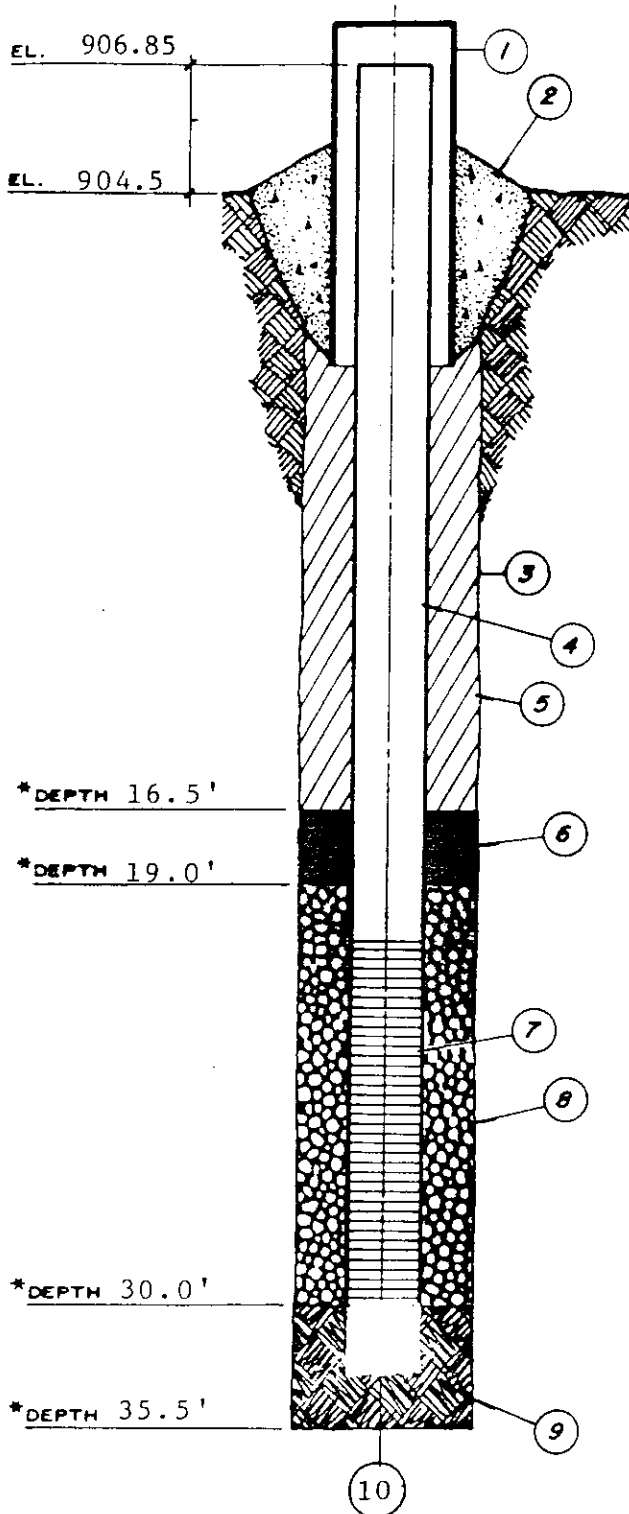
DEPTH (FT.)	SAMPLE NR	BLOW COUNT PER 6 IN.	RECOVERY (IN.)	LITHOLOGIC DESCRIPTION		REMARKS	GRAPHIC LOG
26 28 30 32 34	13	9,14, 21,27	18	GRAY TILL cont.			
	14	9,17 50/4"	16	26.9'-27.3' medium to coarse grained 28.2'-28.3' SAND & GRAVEL, wet			
	15	37, 50/2"	9				
	16	45, 50/3"	9				
	17	43, 50/4"	10				
				sample depth = 32.8', Total Depth = 35.5'		Screen set between 25.0 and 30.0 feet below grade	

MONITOR WELL COMPLETION REPORT :

WELL N^o MP 276 JOB N^o 321-092

PROJECT CECOS, Aber Road

6/14/87



*all depths measured from ground surface.

1. PROTECTIVE CASING I.D. 6 INCHES.

2. SURFACE SEAL TYPE Concrete

3. BOREHOLE DIAMETER 10 INCHES.

4. RISER PIPE:

a. Type Schedule 40 PVC

b. I.D. 4 INCHES

c. Length 27 FEET

d. Joint Type Flush Thread

5. BACKFILL:

a. Type 5% bentonite grout

b. Installation side discharge tremie

6. Type of SEAL 1/4" bentonite pellets

7. SCREEN

a. Type Schedule 40 PVC

b. I.D. 4 INCHES

c. Slot Size 0.010 INCHES

d. Length 5 FEET

8. SCREEN FILTER TYPE #5 silica sand

9. BACKFILL TYPE

10. - 3.0' reservoir below bottom of screen (to 33.0')

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-277A

TEST: Comprehensive Monitoring Program

LOCATION: N: 6443.58 E: 7818.34

DRILL CONTRACTOR: Penn Drill

RIG TYPE: Acker AD-2 HSA

GWA GEOLOGIST: David Silbaugh

DRILLER: Earl Dye

DATE START: 03/14/89

DATE FINISH: 3 /17/89

GRADE ELEVATION: 914.2

TOTAL DEPTH: 48 ft.

CASING TYPE: 316 Stainless Steel

SCREEN TYPE: 316 Stainless Steel

SCREENED INTERVAL: 38.1-43.1

GROUND WATER DATA

DATE	TIME	DEPTH	REMARKS	TYPE	CASING	CORE	SAMPLER	TUBE
04/29/89	1537	11.61		DIAMETER			SS	
05/03/89	-	12.78		HAMMER			2" OD	
05/04/89	-	11.66		FALL			300 lb.	
							30in.	

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
1	S-1	1	16	GLACIAL TILL: gray: mostly silty clay, few fine to coarse grained sand: firm: moist: weathered.		
		2				
		1				
		1				
2	S-2	2	21	SAND: brown: fine to coarse grained sand: loose: moist, wet at 2.3 ft.		
		2				
3		2				
		3				
4	S-3	2	22	GLACIAL TILL: brown: mostly silty clay, trace fine to coarse grained sand, trace gravel, trace rock fragments: hard: dry to moist: iron staining throughout: weathered.		
		3				
5		4				
		9				
6	S-4	5	24			
		9				
7		8				
		11				

REMARKS: Located near the NW corner of SCMF NO. 8 TOC Elevation (measuring reference point) 915.80 ft. (5/8/89)

GROUND WATER ASSOCIATES
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6 1/2 N. State Street
Westerville, Ohio 43081

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OB NO: 321-136

BOREHOLE: MP-277A

CT: Comprehensive Monitoring Program

LOCATION: N: 6443.58 E: 7818.34

DEPTH : 8	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
		8		GLACIAL TILL: continued.		
		8				
9	S-5	10	24			
		12				
10		5		Color change to gray at 11.5 ft.		
		13				
11	S-6	33	24			
		21				
12		12				
		14				
13	S-7	27	24			
		30				
14		36				
	S-8	64/5	11			
15						
16		15		16.0 - 16.5 SAND AND GRAVEL: gray: mostly coarse grained sand and gravel: loose: wet. 16.5-17.0=SAND: gray: fine to medium grained sand: dense: wet. 17.0 GLACIAL TILL: gray: mostly silty clay; trace gravel, small pebbles and fine to coarse sand; hard to very hard: dry to moist.	Refusal on rock	
		23				
17	S-9	26	24			
		27				
18		23			Upper Sand. Water in hole 16-18 ft..	
		33				
19	S-10	41	22			
		31				

REMARKS:

JOB NO: 321-136

BOREHOLE: MP-277A

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 6443.58 E: 7818.34

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
20		22		GLACIAL TILL continued.		
		23				
21	S-11	25	24			
		24				
22		12				
		20				
23	S-12	21	24			
		18				
24		8				
		9				
25	S-13	12	24			
		10				
26		6				
		9				
27	S-14	13	24			
		10				
28		2				
		3				
29	S-15	5	24		29.0 - 29.2: sand and gravel: loose: wet.	
		5			29.7 - 30.1: mostly fine sand, few silt: dense: wet.	
30		7				
		9			30.5 - 30.8: mostly fine to coarse sand: loose: moist to wet.	
31	S-16	21	24			
		27				

REMARKS:

JOB NO: 321-136

BOREHOLE: MP-277A

CT: Comprehensive Monitoring Program

LOCATION: N: 6443.58 E: 7818.34

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
32		21		GLACIAL TILL continued.		
		22				
33	S-17	25	24			
		26				
34		9				
		9				
35	S-18	11	24			
		12				
36		6				
		11				
37	S-19	11	24			
		27				
38		6		37.2 - 38.0: SAND: gray: grading from mostly fine sand to silty sand: dense: moist.		
		9		38.0 - 38.5: Sand and Gravel: gray: mostly gravel, little coarse sand: loose: wet.		
39	S-20	13	24	38.5 - 39.4: SAND: mostly fine to medium sand, little gravel: loose to dense: wet.		
		27		GLACIAL TILL, as above.		
40		18		40.0		
	S-21	52	12	SILTY SAND: gray: mostly fine sand and silt, few coarse sand, trace clay: dense: moist, wet at 42 ft.		
41		27/0				
42		16			Sampler refusal on shale rock fragment.	
	S-22	25	15			
43		37		42.8		
				GLACIAL TILL: gray: mostly silty clay, trace fine to coarse sand, trace gravel: hard to very hard: dry to moist.		

REMARKS:

JOB NO: 321-136

BOREHOLE: MP-277A

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 6443.58 E: 7818.34

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
44		15		GLACIAL TILL: continued		
		26				
45	S-23	37	22			
		39				
46		6				
		15				
47	S-24	18	24			
		30				
48		30		Total Sample Depth = 48 ft.		

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-277B

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 6444.26 E: 7809.36

DRILL CONTRACTOR: Penn Drill

RIG TYPE: Acker AD-2 HSA

GWA GEOLOGIST: David Silbaugh

DRILLER: Earl Dye

DATE START: 03/17/89

DATE FINISH: 03/18/89

GRADE ELEVATION: 913.8

TOTAL DEPTH: 24 ft.

CASING TYPE: 316 Stainless Steel

SCREEN TYPE: 316 Stainless Steel

SCREENED INTERVAL: 16.21

GROUND WATER DATA

DATE	TIME	DEPTH	REMARKS	TYPE	CASING	CORE	SAMPLER	TUBE
04/27/89	1532	8.68		DIAMETER			SS	
05/03/89	-	9.86		HAMMER			300 lb.	
05/04/89	-	9.50		FALL			30in.	

BOREHOLE LOG

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
				0-10 ft. augered without sampling, see well log MP-277A, for lithologic description.		
10		7				
		10				
11	S-1	15	22	GLACIAL TILL: brown: mostly sitty clay; trace fine to coarse sand, gravel and rock fragments: hard: dry to moist.		
		22				
				11.6		
12		5		Sand: brown: mostly fine to medium sand, few silt and clay, trace gravel: loose to dense: moist: dirty sand.	Water in hole 12-14 ft.	
		15				
13	S-2	20	24	GLACIAL TILL: mottled brown and gray: mostly sitty clay, trace gravel and fine to course sand: hard: dry to moist.		
		23				
14		15		Color change to gray at 14 ft.		
		22				
15	S-3	25	20			
		11				
				15.6		
				SAND: gray, mostly fine to course sand, trace 16.0		

REMARKS:

gravel: loose: wet.

TOC Elevation (measuring reference point)
915.50 ft. (5/8/89)

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-277B

PURPOSE: Comprehensive Monitoring Program

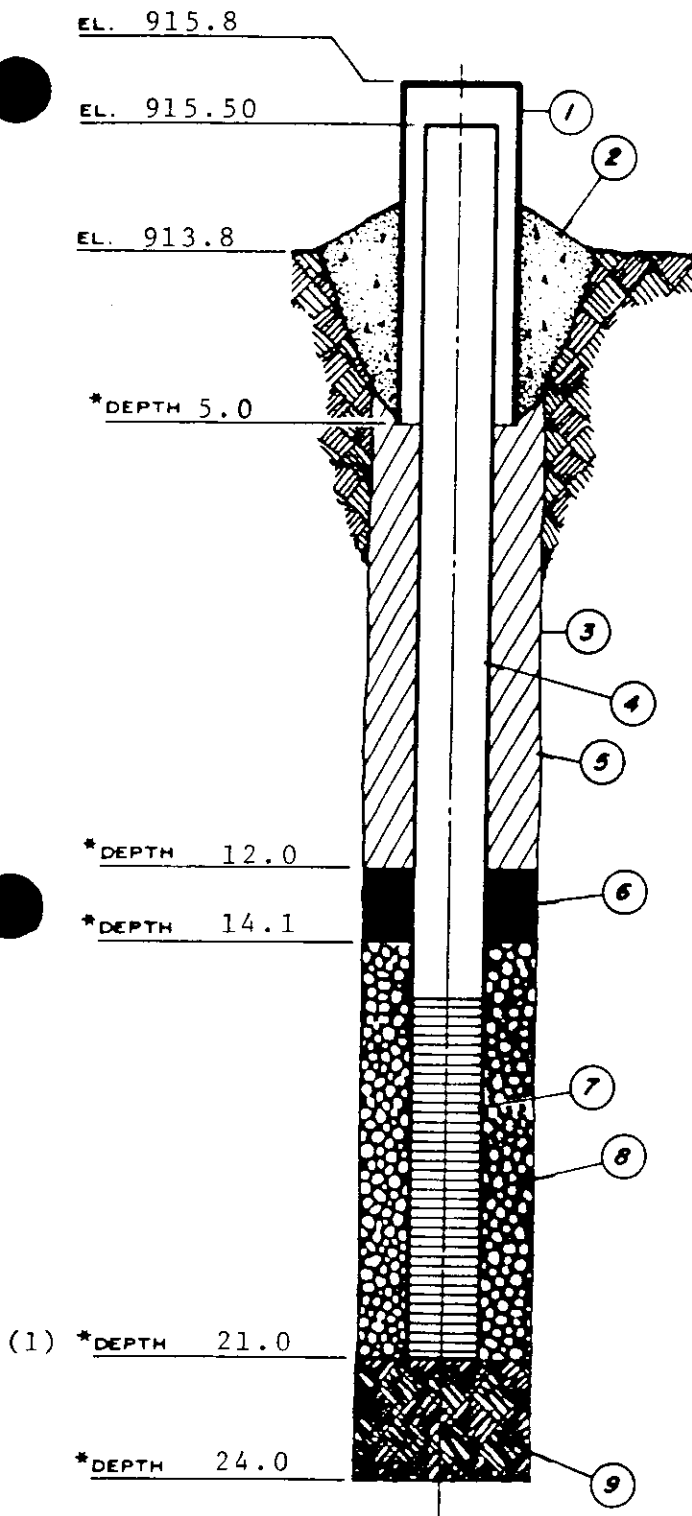
LOCATION: N: 6444.26 W: 6709.36

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
16	S-4	11	24	SANDY CLAY: brown: mostly silt and clay, some f to c sand, trace gravel; dense: moist to wet 16.6 SAND AND GRAVEL: gray: mostly fine to course, some gravel; loose: wet. 16.8		
		18				
17		23				
		24				
18	S-5	7	20	GLACIAL TILL: gray: mostly silty clay; trace fine to course sand and gravel; hard to very hard: dry to moist. 19.2		
		9				
19		21				
		30				
20	S-6	11	22	SAND: gray: coarsens downward from mostly fine sand with some silt and trace gravel; dense; moist (19.2-20.0 ft.) to mostly coarse sand and some gravel; loose; wet (20-21 ft.) 21.0 GLACIAL TILL: as above		
		17				
21		27				
		50				
22	S-7	16	22			
		14				
23		19				
		23				
24				Total Sample Depth = 24 ft.		

REMARKS:

MONITOR WELL COMPLETION REPORT :

WELL N° MP-277B JOB N° 321-136
 PROJECT Comprehensive Monitoring Pro
CECOS - Aber Road



*Depth in feet below grade.

1. PROTECTIVE CASING I.D. 6 INCHES.

2. SURFACE SEAL TYPE Concrete

3. BOREHOLE DIAMETER 12 INCHES.

4. RISER PIPE:

a. Type 316 Stainless Steel

b. I.D. 4 INCHES

c. Length 20 FEET

d. Joint Type Flush Thread

5. BACKFILL:

a. Type 5% Bentonite Cement Grout

b. Installation Side Discharge Tremie

6. Type of SEAL Bentonite Pellet

7. SCREEN

a. Type 316 Stainless Steel

b. I.D. 4 INCHES

c. Slot Size 0.010 INCHES

d. Length 5 FEET

8. SCREEN FILTER TYPE #4 Silica Sand

9. BACKFILL TYPE #4 Silica Sand

(1) 2.9 foot reservoir at bottom of screen

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

Page 1 of 4

JOB NO: 321-136

BOREHOLE: MP-278A

PURPOSE: Comprehensive Monitoring Program

LOCATION: N: 5886.01 E: 8046.22

DRILL CONTRACTOR: Penn Drill

RIG TYPE: Mobile B-53 ATV

GWA GEOLOGIST: Scott A. Beasley

DRILLER: Jim Saccani

DATE START: 3 /31/89

DATE FINISH: 4 /2 /89

GRADE ELEVATION: 917.8

TOTAL DEPTH: 41

CASING TYPE: 316 Stainless Steel

SCREEN TYPE: 316 Stainless Steel

SCREENED INTERVAL: 32.9-37.9

GROUND WATER DATA

DATE	TIME	DEPTH	REMARKS	TYPE	CASING	CORE	SAMPLER	TUBE
04/27/89	1547	35.32		DIAMETER			SS	
05/04/89	-	35.26		HAMMER			300 lb	
/ /				FALL			30in	

BOREHOLE LOG

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
1	S-1	26 28 56 18	19	FILL: Mostly silt and clay with some gravel, pebbles and cobbles, brown, soft, moist. 0.7 GLACIAL TILL: brown: mostly silt and clay little sand and gravel: trace of rock fragments and cobbles: firm to hard: dry to moist.	Presence of some pebbles due to placement of boring on edge of a cobble road.	
2		6 8				
3	S-2	11 12	24			
4		7 17				
5	S-3	7 12	24			
6		3 3				
7	S-4	8 5	13			

REMARKS: Located at the mutual corners of SCMF No. 8, 9 and 10
TOC Elevation (measuring reference point) 919.45 ft. (5/8/89)

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

Page 2 of 4

JOB NO: 321-136

BOREHOLE: MP-278A

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 5886.01 E: 8046.22

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
8		4		GLACIAL TILL: continued.		
		5				
9	S-5	7	10			
		7				
10		2		Mottled brown and gray till with iron staining.		
		2				
11	S-6	4	24			
		5				
12		8				
		9				
13	S-7	12	21			
		14				
14		8				
		54				
15	S-8	77	22			
		56				
16		20				
		37				
17	S-9	35	24			
		65				
18		21		Turns to gray till at 17.5 feet.		
		29				
19	S-10	24	24			
		45				

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

Page 3 of 4

JOB NO: 321-136

BOREHOLE: MP-278A

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 5886.01 E: 8046.22

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
20		15		GLACIAL TILL: continued.		
		25				
21	S-11	26	23			
		42				
22		9				
		18				
23	S-12	32	24			
		22				
24		6				
		17				
25	S-13	17	24			
		18				
26		8				
		12				
27	S-14	15	24			
		35				
28		12				
		23				
29	S-15	20	19			
		25				
30		16		Some moisture noted after 30 feet.		
		32				
31	S-16	20	24			
		38				
32						

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-278A

PROJECT: Comprehensive Monitoring Program

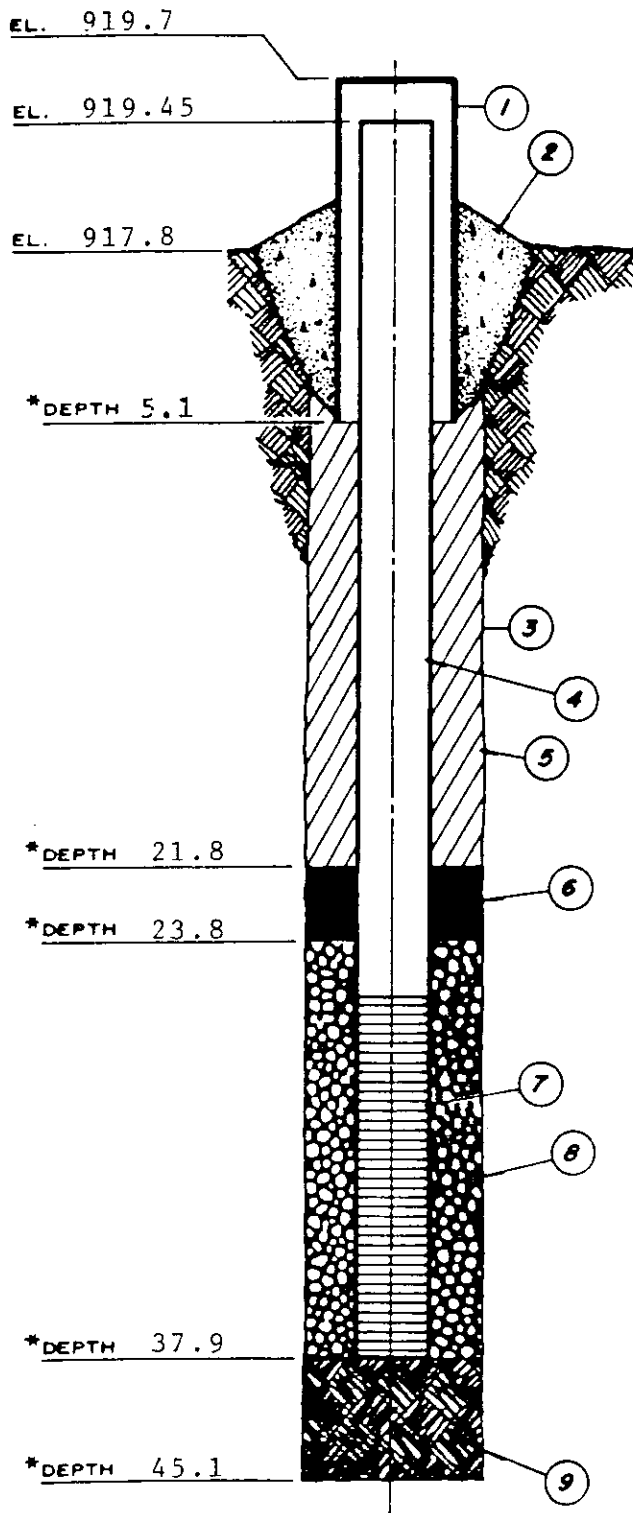
LOCATION: N: 5886.01 E: 8046.22

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
32		5		SAND AND GRAVEL: continued.		
		14				
33	S-17	12	18			
		11				
34				SAND AND GRAVEL: becomes wet at 33.8 ft.		
		5				
		12				
35	S-18	18	24			
		17				
36						
		3		Sand became predominantly coarse after 37ft.		
		4				
37	S-19	15	23			
		20				
38				Mostly gray silt with some sand and gravel, dense: moist. 38.0		
		12				
		25				
39	S-20	86	24			
		135				
40						
		14				
	S-21	34	12			
41				Total Sample Depth = 41 Feet		

Boring was cleaned out to a depth of 45ft. with solid stem augers.
REMARKS:

MONITOR WELL COMPLETION REPORT :

WELL N^o MP-278A JOB N^o 321-136
 PROJECT Comprehensive Monitoring Prog
CECOS - Aber Road



*Depth in feet below grade.

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-279

CT: Comprehensive Monitoring Program

LOCATION: N: 5701.80 E: 8482.38

DRILL CONTRACTOR: Penn Drill

RIG TYPE: Acker AD-2 HSA

GWA GEOLOGIST: David Silbaugh/David Lawton

DRILLER: Earl Dye/Bernie Gollifhue

DATE START: 3 /18/89

DATE FINISH: 3 /29/89

GRADE ELEVATION: 909.6

TOTAL DEPTH: 101 ft.

CASING TYPE: 316 Stainless Steel

SCREEN TYPE: 316 Stainless Steel

SCREENED INTERVAL: 92.5-97.5

GROUND WATER DATA

DATE	TIME	DEPTH	REMARKS	TYPE	CASING	CORE	SAMPLER	TUBE
04/27/89	1521	23.09		DIAMETER		NX	SS	
05/03/89	-	23.48		HAMMER			300 lb.	
/ /				FALL			30in.	

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
1	S-1	1 2 2 5	24	FILL: gray to brown: mostly silty clay, trace to few gravel: hard: dry to moist.		
2						
3	S-2	2 4 4 3	17	Trace wood fragments.		
4						
5	S-3	2 2 2 3	20	Trace wood fragments.		
6						
7	S-4	3 3 3 5	24			

REMARKS: Rig was repaired over plastic, 40 feet north of boring. Boring located near NE corner of SCMF #10. TOC Elevation (measuring reference point) 910.30 ft. (5/8/89)

JOB NO: 321-136

BOREHOLE: MP-279

TEST: Comprehensive Monitoring Program

LOCATION: N: 5701.80 E: 8482.38

DEPTH -8 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19 -20	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
		13		SAND: mostly fine to medium sand, trace gravel dense: moist.		
		11				
	S-5	19	24			
		29				
		12				
		20				
	S-6	16	24			
		12		Color change to gray at 10.8 ft.		
		11				
		11				
	S-7	16	24			
		17				
		6				
		9				
	S-8	10	24			
		15				
		7				
		8				
	S-9	11	24			
		13				
		3				
		5				
	S-10	7	24			
		9				

REMARKS: well located near the SE corner of SCMF No. 9

JOB NO: 321-136

BOREHOLE: MP-279

CT: Comprehensive Monitoring Program

LOCATION: N: 5701.80 E: 8482.38

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
20		13		GLACIAL TILL, continued.		
		39				
21	S-11	58	24			
		50				
22		22		Rock fragment in end of sampler at 24 ft. Sampler refusal, 20 blows for no penetration.		
		22				
23	S-12	28	24			
		101				
24		20R				
25	S-13		0			
26		17				
		24				
27	S-14	31	24			
		50				
28		30				
		39				
29	S-15	50	24			
		63				
30		50				
		49				
31	S-16	57	24			
		56				

REMARKS:

JOB NO: 321-136

BOREHOLE: MP-279

CT: Comprehensive Monitoring Program

LOCATION: N: 5701.80 E: 8482.38

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
32		14		GLACIAL TILL: continued.		
		23				
33	S-17	28	24			
		59				
34		18		Augered without sampling (over augered), no change in auger penetration, no water in hole (Till).		
		24				
35	S-18	34	24			
		50				
36						
37		13				
	S-19	26	12			
38		28				
		35				
39	S-20	60	24			
		59				
40		12				
		18				
41	S-21	25	24			
		28				
42		15				
		24				
43	S-22	25	24			
		41				

REMARKS: Initial rig pulled off hole for repairs after drilling 40 ft.

DP-0: 321-136

BOREHOLE: MP-279

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 5701.80 E: 8482.38

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
44		17		GLACIAL TILL: continued		
		28				
45	S-23	31	24			
		33				
46		11				
		19				
47	S-24	23	24			
		30				
48		15				
		18				
49	S-25	21	24			
		29				
50		13				
		15				
51	S-26	15	24			
		20				
52		11				
		13				
53	S-27	18	24			
		36				
54		10				
		12				
55	S-28	15	24			
		18				
56						

REMARKS:

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JOB NO: 321-136

BOREHOLE: MP-279

CT: Comprehensive Monitoring Program

LOCATION: N: 5701.80 E: 8482.38

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
56		12		GLACIAL TILL: continued.	From 56' to 60' gradual color change downward to green/gray.	
		12				
57	S-29	11	22			
		14				
58		9				
		12				
59	S-30	18	18			
		29				
60		11				
		11				
61	S-31	7	24			
		11				
62		6				
		10				
63	S-32	11	24			
		15				
64		11				
		15				
65	S-33	32	24			
		100				
66		14				
		22				
67	S-34	23	24			
		31				

REMARKS:

POP NO: 321-136

BOREHOLE: MP-279

WT: Comprehensive Monitoring Program

LOCATION: N: 5701.80 E: 8482.38

DEPTH #68	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG									
				LITHOLOGIC DESCRIPTION	REMARKS	LOG							
		9		GLACIAL TILL: continued	Refusal @ 73.8'/20 blow.								
		20											
69	S-35	32	24										
		36											
70		18											
		26											
71	S-36	31	24										
		61											
72		14											
		67											
73	S-37	58	22										
		78/4											
				73.2							SAND: fine to coarse downward, trace clay. silt. No discernable bedding: Wet: loose.		
74		20		Some gravel and pebbles at base.									
		7											
75	S-38	8	24										
		14											
				74.8							CLAY: blue/gray: trace pebbles at top: soft- firm: moist. Occasional thin silty layers. (varved).		
76		7											
		7											
77	S-39	9	24										
		10											
78		4											
		4											
79	S-40	4	24										
		5											

REMARKS:

JOB NO: 321-136

BOREHOLE: MP-279

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 5701.80 E: 8482.38

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
80		2		CLAY: continued.		
		2				
81	S-41	3	24			
		5				
82		2				
		2				
83	S-42	3	24			
		5				
84		1				
		3				
85	S-43	3	24			
		4			85.6 - black streaks of carbonaceous material.	
86		2				
		2				
87	S-44	2	24			
		5			Color change at 87.5 to dark gray with black.	
88		3				
		3				
89	S-45	5	24			
		8			Trace of black carbonaceous material.	
90		2				
		3				
91	S-46	6	24			
		6			Silty in occasional laminar layers (varved).	

REMARKS:

JOB NO: 321-136

BOREHOLE: MP-279

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 5701.80 E: 8482.38

DEPTH -92	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
		2		Trace dispersed gravel.		
		4				
93	S-47	5	24			
		23				
94				93.7 thin sandy lens. Fine-med. grained. wet. 93.8 Broken limestone rock. 94.0 - 94.2 CLAY: as above.		
	S-48	41		94.2 BEDROCK: SHALE: light to medium gray: laminar interbedded with very fossiliferous bedded LIMESTONE. Soft sediment flow around lime- stone clasts and fossil breaks along shale laminations.	Core interval = 96 - 101 ft. REC = 100% REQ = 70%	
95		47 1/2	8			
				CORE RUN #1		
96				SHALE: light to medium gray: laminar-thin beds interbedded with very fossiliferous, thin bedded LIMESTONE. Soft sediment flow charact- er around limestone clasts and fossils - Core breaks along shale laminations.	INT. = 96-101ft. REC. = 100% ROD = 70%	
97						
98						
99						
100						
101				CORING TO 101 FEET		

REMARKS:

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JOB NO: 321-136

BOREHOLE: MP-280

TEST: Comprehensive Monitoring Program

LOCATION: N: 5428.95 E: 8292.08

DRILL CONTRACTOR: Penn Drill

RIG TYPE: Acker AD-2 HSA

GWA GEOLOGIST: David Silbaugh

DRILLER: Earl Dye

DATE START: 3 /28/89

DATE FINISH: 4 /5 /89

GRADE ELEVATION: 907.8

TOTAL DEPTH: 105 ft.

CASING TYPE: 316 Stainless Steel

SCREEN TYPE: 316 Stainless Steel

SCREENED INTV. 97.5- 102.5

GROUND WATER DATA

DATE	TIME	DEPTH	REMARKS	TYPE	CASING	CORE	SAMPLER	TUBE
04/27/89	1511	22.65		DIAMETER		NX	SS	
05/03/89	-	21.63		HAMMER		3" OD	2" OD	
/ /				FALL			3001b.	
							301n.	

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
1	S-1	1 1 2 3	16	FILL?: brown: mostly silty clay. trace fine to coarse sand: firm: moist. 1.0 FILL: mottled light brown and gray: mostly silty clay. trace fine to coarse sand: firm. plastic: moist.		
2		2 2				
3	S-2	2 3	20			
4		3 2				
5	S-3	2 3	15			
6		1 2				
7	S-4	4 9	24	6.6 Silty fine sand: brown: loose: moist. 6.8 GLACIAL TILL: brown: mostly silty clay. few gravel. trace fine to coarse sand: hard to very hard: dry to moist.		

REMARKS: Gasoline tank on rig has slow leak and was being contained in a 3 gallon bucket.
TOC Elevation (neasuring reference point) 909.92 ft. (5/8/89)

JOB NO: 321-136

BOREHOLE: MP-280

CT: Comprehensive Monitoring Program

LOCATION: N: 5428.95 E: 8292.08

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
8		13		GLACIAL TILL, continued		
		14				
9	S-5	17	24			
		22				
10		10		iron staining common 10-12 ft.		
		11				
11	S-6	15	24			
		20				
12		6		Color change to gray at 12 ft. GLACIAL TILL: gray; mostly silty clay, trace to few gravel and small pebbles, trace fine to coarse sand, trace rock fragments: hard to very hard; dry to moist.	added 10 gal. water at 10 ft.	
		18				
13	S-7	18	24			
		24				
14		7				
		11				
15	S-8	11	24			
		16				
16		9				
		8				
17	S-9	9	24			
		13				
18		4				
		6				
19	S-10	10	24			
		11				

REMARKS: Left rear hydraulic jack leaking small amount of fluid, being contained by depression made while leveling rig.

OP-NO: 321-136

BOREHOLE: MP-280

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 5428.95 E: 8292.08

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
20		2		GLACIAL TILL, continued	Refusal on rock	
		4				
21	S-11	8	24			
		9				
22		9				
		12				
23	S-12	23	24			
		21				
24		6				
		12				
	S-13	27	24			
		24				
26		13		SAND AND GRAVEL: brown to gray: mostly fine to coarse sand, few gravel and small pebbles: bottom 0.3 ft. is gray green and composed mostly of broken rock fragments: loose: wet: fining upward sequence.		
		17				
27	S-14	20	24			
		38				
28		48		GLACIAL TILL: gray: mostly silty clay, trace to few gravel, trace fine to coarse sand: hard to very hard: dry to moist.		
	S-15	60/3	9			
29						
30		15				
		47				
31	S-16	58	22			
		61				
32						

REMARKS: Well is located on the SE side of SCMF No. 10

GROUND WATER ASSOCIATES
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6 1/2 N. State Street
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JOE NO: 321-136

BOREHOLE: MP-280

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 5428.95 E: 8292.08

LOCATION: N: 5428.95 E: 8292.08						
DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	
32	S-17	65 100/3	9	GLACIAL TILL, continued	No penetration over 20 blows.	
33				SAND AND GRAVEL: gray: mostly fine to coarse sand, some gravel: loose: wet.	Easy drilling 33-34 ft.	
34						
35		S-18	20 30 40 50	24		GLACIAL TILL: gray: mostly silty clay: few gravel, trace fine to coarse sand: hard to very hard: dry to moist.
36	S-19	30 40 46 95	24			
38		S-20	28 40 55 67	24		
39						
40						
41	S-21		1 3 23 53	24		
42	S-22	35 50 55 100	24			
43						
44						

REMARKS:

GROUND WATER ASSOCIATES
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Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-280

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 5428.95 E: 8292.08

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
44		33		GLACIAL TILL. continued	No penetration over 20 blows.	
	S-23	60	16			
45		135/4				
46						
47	S-24	68	24		No penetration over 20 blows.	
		110				
48		43				
	S-25	53	18			
49		110/6			No penetration over 20 blows.	
50						
		19				
		28				
51	S-26	69	24		No penetration over 20 blows.	
		85				
52		29				
		42				
53	S-27	60	24		No penetration over 20 blows.	
		112				
54		24				
		35				
55	S-28	43	24		No penetration over 20 blows.	
		62				

REMARKS:

JOB NO: 321-136

BOREHOLE: MP-280

CT: Comprehensive Monitoring Program

LOCATION: N: 5428.95 E: 8292.08

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
56		20		GLACIAL TILL, continued.		
		27				
57	S-29	37	24			
		62				
58		29		59.1-59.5 clayey coarse sand fining downward to clayey silt: hard: dry.		
		34				
59	S-30	74	24			
		83				
60		7		Augered without sampling 62-63 ft., no change in drilling rate.		
		18				
61	S-31	23	24			
		68				
62						
63	S-32	33	12			
		31				
64		28				
		52				
65	S-33	110	21		No penetration over 20 blows.	
		110/3				
66	S-34	51	12			
		90				
		20/0			No penetration over 20 blows.	
67						

REMARKS:

JOB NO: 321-136

BOREHOLE: MP-280

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 5428.95 E: 8292.08

DEPTH -68	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
68	S-35	43	24	GLACIAL TILL, continued. color change to blue gray at 68 ft.		
		47				
69		53				
		74				
70	S-36	9	24	70-74.8 increase in clay content and decrease in granular percentage.		
		13				
71		16				
		11				
72	S-37		18	Augered without sampling 72-72.5 ft., no change in drilling rate.		
		17				
73		16				
		20				
74	S-38	4	24	SAND: gray; coarsens downward from mostly fine sand with little silt; dense; moist (74.8-76ft.) to mostly coarse sand and gravel; loose; wet (76-76.6ft.).		
		23				
75		31				
		111				
76	S-39	24	24	GLACIAL TILL: blue gray; mostly clay, some silt, trace gravel and coarse sand; hard; dry to moist.		
		9				
77		13				
		18				
78	S-40	11	0			
		20				
79		20				
		27				

REMARKS: Transmission went out on rig at 1630 hrs. on 3-30-89. Repaired at drilling location.
Rig running again at 1300 hrs. on 4-2-89.

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JOB NO: 321-136

BOREHOLE: MP-280

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 5428.95 E: 8292.08

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
80		5		GLACIAL TILL, continued.		
		9				
81	S-41	10	21			
		27				
82		8		SAND: gray; fining downward from mostly coarse sand and clay with little gravel to mostly fine to medium sand; loose; wet.		
		10				
83	S-42	17	24			
		26				
84		11		GLACIAL TILL: blue gray; interval grades from a clay till with few gravel and coarse sand, trace rock fragments to a CLAY with trace of		
		13		of coarse sand and plant material (rootlets);		
85	S-43	16	24	hard; dry to moist.		
		17				
86		10		CLAYEY SAND: gray, bottom 0.4 ft. black;		
		10		mostly fine to medium sand, few clay; trace		
87	S-44	14	24	gravel, coarse sand and plant material; loose;		
		15		wet; dirty sand.		
88		2		CLAY: gray; firm; dry to moist; plastic;		
		8		sharp upper contact.		
89	S-45	10	22	SANDY CLAY: gray; mostly clay, some fine to		
		11		coarse sand, few gravel, trace plant material;		
90				firm; wet.		
				CLAY: gray; soft to firm; dry to moist; very		
				plastic, homogeneous.		
91	S-46	WOR/18 8	24		Rods penetrate 90-91.5 ft. under own weight drove sample 91.5 - 93.5 ft.	
92						

REMARKS: Clay is soft, sample rods penetrate under their own weight.

JOB NO: 321-136

BOREHOLE: MP-280

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 5428.95 E: 8292.08

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
92		4		CLAY, continued.		
		3				
93	S-47	5	24			
		6				
94						
95	S-48	WOR/18 3	24		Rods penetrated 94-95.5 ft. under own weight drove sample - 95.5-97.5	
96				color change to dark gray		
		WOR/24				
97	S-49		24	gradational contact		
				CLAYEY SILT: green: mostly silt, little clay. trace fine to coarse sand: soft: dry to moist.	Rods free fell 40 ft. and drove a 2 ft. sample 96-98ft.	
98						
		WOR/12				
99	S-50	11	21	TOP OF ROCK		
		58/3		99.0-99.7 WEATHERED SHALE; gray to green: 99.7-105 ft. interbedded fossiliferous limestone and calcareous shale.	core interval- 100-105 ft. Recovery=40% RQD = 7%	
100						
101					Poor recovery due to washing out of shale beds during coring.	
102				Bedrock reamed 100-105.5 ft. with 6 in. OD solid stem augers.		
103				Total depth 105.5 ft.		

REMARKS:

GROUND WATER ASSOCIATES
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JOB NO: 321-136

BOREHOLE: MP-280A

PURPOSE: Comprehensive Monitoring Program

LOCATION: N: 5442.13 E: 8302.61

DRILL CONTRACTOR: Penn Drill

RIG TYPE: Acker AD-2 HSA

GWA GEOLOGIST: David Silbaugh

DRILLER: Earl Dye

DATE START: 4 /13/89 DATE FINISH: 4 /14/89

GRADE ELEVATION: 907.1 TOTAL DEPTH: 35 ft.

CASING TYPE: 316 Stainless Steel

SCREEN TYPE: 316 Stainless Steel

SCREENED INTERVAL: 23-28 ft.

GROUND WATER DATA

DATE	TIME	DEPTH	REMARKS	TYPE	CASING	CORE	SAMPLER	TUBE
04/28/89	1300	23.63		DIAMETER			SS	
05/03/89	-	24.72		HAMMER			3001b.	
/ /				FALL			301n.	

BOREHOLE LOG

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
				Augered 0-15 feet without sampling. see well log MP-280 for lithologic description.		
15		6				
		8				
16	S-1	11	24	GLACIAL TILL: gray: mostly silt and clay, few gravel and small pebbles, trace fine to coarse sand: hard to very hard: dry to moist:	Dry hole 0-24 ft.	
		11				
17		5				
		7				
18	S-2	6	24			
		8				
19		4				
		5				
20	S-3	6	24			
		8				

REMARKS: Located on SE side of SCMF No. 10

TOC Elevation (measuring reference point)
909.09 ft. (5/8/89)

GROUND WATER ASSOCIATES
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6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-280A

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 5442.13 E: 8302.61

BOREHOLE LOG

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
21		5		GLACIAL TILL: continued		
		6				
22	S-4	11	24			
		10				
23		5		24.1 SAND AND GRAVEL: mostly fine to coarse sand, some gravel, few small pebbles: loose: wet: clean.		
		8				
24	S-5	8	24			
		10				
25		WOR/12		27.3 GLACIAL TILL: gray: mostly silt and clay, few gravel and fine to coarse sand, trace rock fragments: hard: dry to moist.		
26	S-6	3	16			
		5				
27		11				
		15				
28	S-7	19	24			
		24				
29		22				
		28				
30	S-8	54	24			
		76				
31		14				
		30				
32	S-9	99	21			
		87/3				
					No penetration over 20 blows.	

REMARKS:

JOB NO: 321-136

BOREHOLE: MP-280A

CT: Comprehensive Monitoring Program

LOCATION: N: 5442.13 E: 8302.61

BOREHOLE LOG						
DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
33		24		33.1-33.3, silt. loose, dry to moist.		
		37				
34	S-10	61	24			
		73				
35				Total sample depth - 35 feet.		

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-281

PURPOSE: Comprehensive Monitoring Program

LOCATION: N: 5386.64 E: 7724.75

DRILL CONTRACTOR: Penn Drill

RIG TYPE: Acker AP-2 HSA

GWA GEOLOGIST: David Lawton

DRILLER: Bernie Gollihue

DATE START: 4 / 2 / 89

DATE FINISH: 4 / 4 / 89

GRADE ELEVATION: 911.6

TOTAL DEPTH: 77

CASING TYPE: 316 Stainless Steel

SCREEN TYPE: 136 Stainless Steel

SCREENED INTERVAL: 69.5-74.5

GROUND WATER DATA

DATE	TIME	DEPTH	REMARKS	TYPE	CASING	CORE	SAMPLER	TUBE
04/27/89	1602	29.29		DIAMETER		NX	Sp1t Sp	
05/03/89	-	29.24		HAMMER		3" OD	2 in OD	
/ /				FALL			300 lb	
							30 in	

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
				Augered 0-44 ft. without sampling. For lithology see MP-281A.		
44		6				
		11				
45	S-1	16	24	TILL: gray: silty clay, few gravel, trace small pebbles: hard: moist-dry.		
		16				
46		7				
		10				
47	S-2	9	24			
		13				
48		5				
		8		Moist, somewhat plastic.		
49	S-3	7	24			
		12				
50	S-4	14				
		24	20	SAND: brown/gray: mostly fine to medium sand, few silt, trace gravel: loose: wet.		

REMARKS: Located near the SW corner of SCMF No. 10
TOC Elevation (measuring reference point) 913.64 ft. (5/8/89)

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 W. State Street
Westerville, Ohio 43081

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JOH NO: 321-136

BOREHOLE: MP-281

CT: Comprehensive Monitoring Program

LOCATION: N: 5386.64 E: 7724.75

				BOREHOLE LOG		
DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
51		79				
		62				
52		4				
		4				
53	S-5	7	22	Pulled out 2 ft. of sand when cleaning with inner string from 52-54. Spoon dropped to 56 ft. No sample.		
		14				
54						
55						
56		1		57.1 - 57.5 ft. silty sand		
		2				
57	S-6	7	24			
		16				
58		2		Change to SAND AND GRAVEL at 58.4 ft.		
		2				
59	S-7	7	24			
		62				
60		3		SAND AND GRAVEL: most coarse sand, some gravel, few small pebbles: loose: wet.		
		4				
61	S-8	5	24			
		6				
62						
63	S-9	8				

Augered without sampling
62.0-62.5 ft.

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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WELL ID: 321-136

BOREHOLE: MP-281

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 5386.64 E: 7724.75

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
63	S-9	8	24	SAND AND GRAVEL: continued	See well log MP-281C	
		17				
64		19		TILL: gray: with silt, few gravel, few pebbles		
	S-10	42	24			
65		8		SAND: med-coarse sand with gravel and pebbles: clayey-dirty: possibly fallen in hole from above.		
		17				
66		29				
	S-11	37	18	TILL: gray: as above.		
67		7				
		11				
68	S-12	13	24	Mottled olive green/gray.		
		10				
69		14				
		15				
70	S-13	22	22	Color change to olive green.	Core intervals 72-77 ft. REC = 100% ROD = 24%7	
		4				
71		6				
		36				
72		58/4		BEDROCK: Limestone and shale interbedded: 71.3-72.0 Limestone interbedded with weathered shale: 72-77 ft. interbedded fossiliferous limestone and calcareous shale: core breaks along bedding planes.		
73						
74						
75						

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-281A

PURPOSE: Comprehensive Monitoring Program

LOCATION: N: 5387.67 E: 7719.01

DRILL CONTRACTOR: Penn Drill

RIG TYPE: Acker AD-2 HSA

GWA GEOLOGIST: David Lawton

DRILLER: Bernie Gollihue

DATE START: 3 /31/89

DATE FINISH: 4 /2 /89

GRADE ELEVATION: 912.0

TOTAL DEPTH: 50ft.

CASING TYPE: 316 Stainless Steel

SCREEN TYPE: 316 Stainless Steel

SCREENED INTERVAL: 30.5-35.5

GROUND WATER DATA					CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	REMARKS	TYPE			Splt Sp	
04/27/89	1600	31.13		DIAMETER			2"OD	
05/03/89	-	30.82		HAMMER			3001b.	
/ /				FALL			30in.	

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
1	S-1	2 3 2 3	24	FILL (till?): brown: silty with some gravel: soft: moist-wet.		
2		2 4				
3	S-2	4 5	22			
4		3 3				
5	S-3	3 3	14			
6		8 2		Silty SAND(FILL?): fine grained, few-trace clay soft-loose: wet.		
7	S-4	2 3	24			
				CLAY: gray: soft: plastic. Moist.		

REMARKS: Located near the SW corner of SCMF No. 10
TOC Elevation (measuring reference point) 913.83 ft. (5/8/89)

GROUND WATER ASSOCIATES
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6 1/2 N. State Street
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JOB NO: 321-136

BOREHOLE: MP-281A

PROJECT: Comprehensive Monitoring Program

LOCATION: SW corner cell no. 10

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
8		2		CLAY: continued, with some iron staining.		
		3				
9	S-5	1	22			
		6				
10		1				
		1				
11	S-6	1	24			
		9				
12		24		TILL: brown: firm-hard: dry-moist: silty, with some sand, gravel trace pebbles.		
		31				
13	S-7	27	24			
		33				
14		16		Some gray mottling.		
		17				
15	S-8	26	24			
		42				
16		19				
		18				
17	S-9	24	24			
		19				
18		6		Moist.		
		10				
19	S-10	11	24			
		26				

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-281A

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 5387.67 E: 7719.01

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
20		3		TILL: continued.		
		5				
21	S-11	12	22			
		10				
22		6				
		10				
23	S-12	11	24			
		14				
24		5				
		9				
25	S-13	11	24			
		13				
26		6				
		10				
27	S-14	10	24			
		10				
28		11				
		25				
29	S-15	41	24			
		110				
30		31				
		35				
31	S-16	29	24			
		26				
32						

28.8
SAND AND GRAVEL: gray: fine-coarse sand, some gravel and pebbles: loose: moist at top, wet at bottom.

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-281A

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 5387.67 E: 7719.01

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
32		8		SAND AND GRAVEL: continued. Increasing amount of gravel and pebbles downward.		
		19				
33	S-17	19	24			
		22				
34		4		35.6 TILL: gray: silty. with clay. hard: moist: with some gravel, few pebbles: hard: dry to moist.		
		17				
35	S-18	9	22			
		17				
36		14				
		14				
37	S-19	14	24			
		21				
38		9				
		10				
39	S-20	13	24			
		17				
40		7				
		11				
41	S-21	14	24			
		22				
42		13				
		19				
43	S-22	40	21			
		46				

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-281A

PURPOSE: Comprehensive Monitoring Program

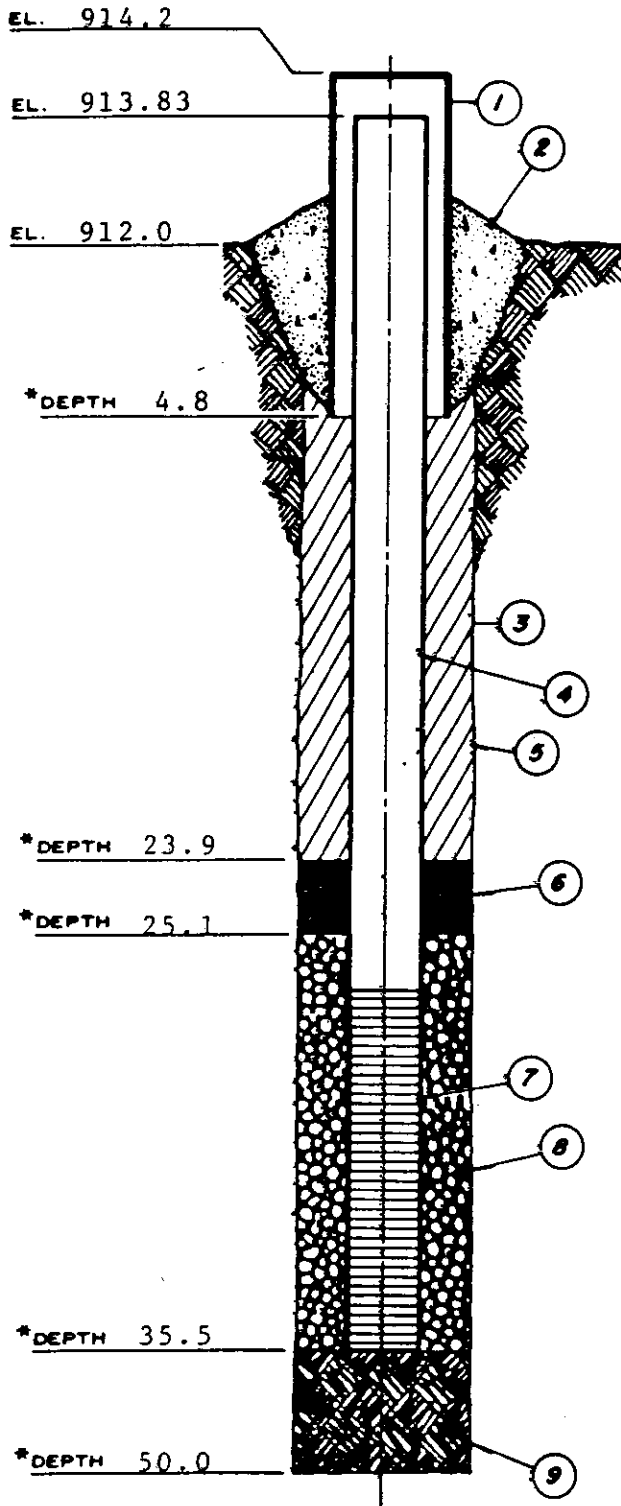
LOCATION: N: 5387.67 E: 7719.01

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
44		10		TILL: continued.		
		15				
45	S-23	15	24			
		24				
46		11		Brown/gray		
		18				
47	S-24	17	24			
		12				
48		10				
		15				
49	S-25	16	24	SAND AND GRAVEL: coarse at top, fining downward to silty, fine grained sand. Gray: loose -firm: trace of clay in silt. Wet.		
		18				
50	S-26	61/2	2	REFUSAL ON BOULDER....got pieces up in split spoon.		
				Total Sample Depth = 50.2 Feet		

REMARKS: To be completed as an "880" sand well due to refusal on boulder.

MONITOR WELL COMPLETION REPORT :

WELL N^o MP-281A JOB N^o 321-136
 PROJECT Comprehensive Monitoring Prog
CECOS - Aber Road



*Depth in feet below grade.

1. PROTECTIVE CASING I.D. 6 INCHES.
2. SURFACE SEAL TYPE Concrete
3. BOREHOLE DIAMETER 12 INCHES.
4. RISER PIPE:
 - a. Type 316 Stainless Steel
 - b. I.D. 4 INCHES
 - c. Length 32.5 FEET
 - d. Joint Type Flush Thread
5. BACKFILL:
 - a. Type 5% Bentonite Cement Grout
 - b. Installation Side Discharge Tremie
6. Type of SEAL Bentonite Pellet
7. SCREEN
 - a. Type 316 Stainless Steel
 - b. I.D. 4 INCHES
 - c. Slot Size 0.010 INCHES
 - d. Length 5 FEET
8. SCREEN FILTER TYPE #4 Silica Sand
9. BACKFILL TYPE 50-46.5 ft. #4 Silica Sand; 46.5-44.3 ft. Bentonite Pelle
44.3-35.5 ft. natural backfill.

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 W. State Street
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JOB NO: 321-136

BOREHOLE: MP-281C

PURPOSE: Comprehensive Monitoring Program

LOCATION: N: 5382.40 E: 7730.97

DRILL CONTRACTOR: Penn Drill

RIG TYPE: Acker AD-2 HSA

GWA GEOLOGIST: David L. Lawton

DRILLER: Bernie Gollihue

DATE START: 4 /5 /89

DATE FINISH: 4 /11/89

GRADE ELEVATION: 912.7

TOTAL DEPTH: 71'

CASING TYPE: 316 Stainless Steel

SCREEN TYPE: 316 Stainless Steel

SCREENED INTERVAL: 55'-60'

GROUND WATER DATA

DATE	TIME	DEPTH	REMARKS	TYPE	CASING	CORE	SAMPLER	TUBE
04/27/89	1603	29.67		DIAMETER			Splt Sp	
05/03/89	-	29.82		HAMMER			3001b	
/ /				FALL			301n	

BOREHOLE LOG

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
				Augered 0-45ft. without sampling for lithology. See log from MP-281A.		
45		9				
		7				
46	S-1	13	24			
		17				
47		10				
		11				
48	S-2	12	24			
		14				
49		6				
		8				
50	S-3	9	24			
		12				

REMARKS: Located near the SW corner of SCMF No. 10
TOC Elevation (measuring reference point) 914.21 ft. (5/8/89)

JF NO: 321-136

BOREHOLE: MP-2B1C

CT: Comprehensive Monitoring Program

LOCATION: N: 5382.40 E: 7730.97

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
51		7				
		39				
52	S-4	32	24			
		42				
53		4				
		4				
54	S-5	4	24			
		6				
55						
5	S-6		20			
				-Sampled after cleaning hole with augers. Sand heaved about 10 ft.. Split spoon was nearly full when withdrawn.....		
				Augered to 57 ft.		
57		22				
		13				
58	S-7	15	24			
		21				
				58.5-58.6 SAND AND GRAVEL		
				TILL: as above		
59		4				
		7				
60	S-8	14	24			
		18				
61		7				
		11				
62	S-9	17	24			
		26				
63						

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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NO: 321-136

BOREHOLE: MP-281C

CT: Comprehensive Monitoring Program

LOCATION: N: 5382.40 E: 7730.97

BOREHOLE LOG

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
63		5		TILL: continued.		
		12				
64	S-10	18	24			
		21				
65		7				
		7				
66	S-11	34	21			
		24				
67		7				
		13				
	S-12	28	24			
		100/1			Refusal on limestone cobble.	
69		7				
		14				
70	S-13	13	24			
		67				
71				WEATHERED SHALE: BEDROCK		
				Total Sample Depth - 71 Feet		

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-282C

PURPOSE: Comprehensive Monitoring Program

LOCATION: N: 4759.65 E: 7799.27

DRILL CONTRACTOR: Penn Drill

RIG TYPE: Acker

GWA GEOLOGIST: David Lawton

DRILLER: Bernie Gollihue

DATE START: 3 /17/89

DATE FINISH: 3 /19/89

GRADE ELEVATION: 908.2

TOTAL DEPTH: 69'

CASING TYPE: 316 Stainless Steel

SCREEN TYPE: 316 Stainless Steel

SCREENED INTERVAL: 49.5-64.5

GROUND WATER DATA				CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	REMARKS	TYPE		Splt Sp	
04/27/89	1504	26.92		DIAMETER		2"	
/ /				HAMMER		300#	
/ /				FALL		30"	

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
45				Augered 0-45 ft. without sampling. See WELL LOG for piezometer 12-3 for lithologic description.		
46	S-1	8 16 20 27	22	TILL: gray: mostly silty clay, few gravel: trace small pebbles: hard: dry to moist.		
47				46.8		
48	S-2	9 10 18 38	24	SAND: gray: mostly fine to coarse sand: few silt gravel: trace small pebbles: loose: wet: interval composed of coarsening downward sequences.		
49						
50	S-3	24 36 18 20	24			
51	S-4	2 4	24			

REMARKS: Located near the SE corner of proposed SCMF No. 12
TOC Elevation (measuring reference point) 911.31 ft. (5/10/89)

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
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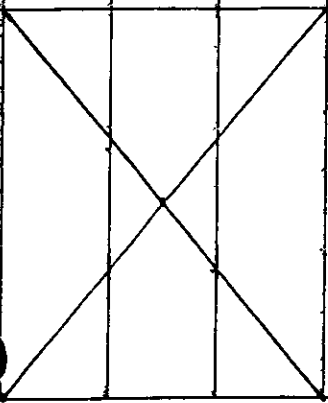
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JOB NO: 321-136

BOREHOLE: MP-282C

PURPOSE: Comprehensive Monitoring Program

LOCATION: N: 4759.65 E: 7799.27

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
52		7		SAND: continued.		
	S-4	10	24			
53		5				
		8				
54	S-5	23	24	57.0-58.1 SAND AND GRAVEL		
		32				
55		6				
		14				
56	S-6	14	24			
		16				
57		6				
		9				
58	S-7	16	20			
		22				
59		1				
		1				
60	S-8	1	24			
		3				
61				Could not sample because of heaving sand.		
62						
63						
64						

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-282C

PROJECT: Comprehensive Monitoring Program

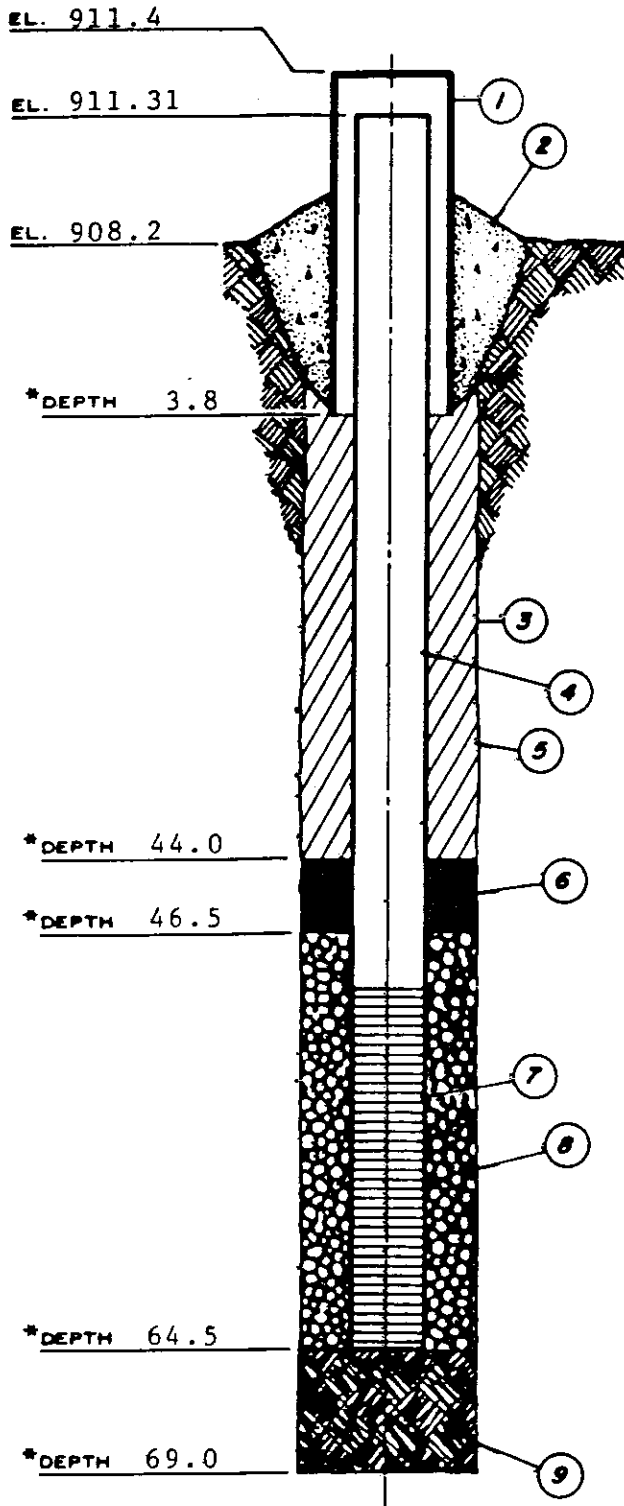
LOCATION: N: 4759.65 E: 7799.27

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
64		11				
		20				
65	S-9	27	24	TILL: gray: mostly silt and clay, some gravel, trace fine to coarse sand: hard: dry to moist.		
		30				
66				Augered without sampling.		
67				TILL: as above		
		9				
		9				
68	S-10	10	5	Poor recovery because of sand coming in from above.		
		12				
69				Total Sample Depth = 69 Feet		

REMARKS:

MONITOR WELL COMPLETION REPORT :

WELL N^o MP-282C JOB N^o 321-136
 PROJECT Comprehensive Monitoring Prog
CECOS - Aber Road



*Depth in feet below grade.

1. PROTECTIVE CASING I.D. 4 INCHES.
2. SURFACE SEAL TYPE Concrete
3. BOREHOLE DIAMETER 10 INCHES.
4. RISER PIPE:
 - a. Type 316 Stainless Steel
 - b. I.D. 2 INCHES
 - c. Length 52.5 FEET
 - d. Joint Type Flush Thread
5. BACKFILL:
 - a. Type 5% Bentonite Cement Grout
 - b. Installation Side Discharge Tremie
6. Type of SEAL Bentonite Pellet
7. SCREEN
 - a. Type 316 Stainless Steel
 - b. I.D. 2 INCHES
 - c. Slot Size 0.010 INCHES
 - d. Length 15 FEET
8. SCREEN FILTER TYPE #4 Silica Sand and Formation Sand
9. BACKFILL TYPE Formation Sand

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
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JOB NO: 321-136

BOREHOLE: MP-283C

CT: Comprehensive Monitoring Program

LOCATION: N: 4433.97 E: 7524.92

DRILL CONTRACTOR: Penn Drill

RIG TYPE: Acker AD-2 HSA

GWA GEOLOGIST: D. Lawton

DRILLER: B. Gollihue

DATE START: 3 /19/89

DATE FINISH: 3 /21/89

GRADE ELEVATION: 912.5

TOTAL DEPTH: 75 ft.

CASING TYPE: 316 Stainless Steel

SCREEN TYPE: 316 Stainless Steel

SCREENED INTERVAL: 59'-64'

GROUND WATER DATA

DATE	TIME	DEPTH	REMARKS	TYPE	CASING	CORE	SAMPLER	TUBE
04/27/89	1455	30.89		DIAMETER			SPL SP	
/ /				HAMMER			3001b.	
/ /				FALL			30 in.	

BOREHOLE LOG

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
				Augered 0-45 ft. without sampling: see WELL LOG of piezometer 13-5 for lithologic description.		
45		6				
		7				
46	S-1	10	24	TILL: brown: mostly clay and silt, some gravel: hard: dry to moist.		
		12				
47		8				
		7				
48	S-2	7	24			
		11				
49		7				
		6				
50	S-3	6	24	50.6 - 50.9 increasing amount of sand (course).		
		10				

REMARKS: Located near East Central side of proposed SCMF No. 13
TOC Elevation (measuring reference point) 915.27 ft. (5/10/89)

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
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JOB NO: 321-136

BOREHOLE: MP-283C

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 4433.97 E: 7524.92

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
51		4				
		2				
52	S-1	2	24			
		7				
53		6				
		7				
54	S-2	8	24			
		10				
55		6				
		4				
56	S-3	4	20			
		7				
57		6				
		6				
58	S-3	7	24			
		8				
59		6				
		8				
60	S-4	9	24			
		10				
61		27				
		59				
62	S-5	48	24			
		25				
63						

57.2
SILTY CLAYEY SAND: gray: soft: loose: wet.

57.6
TILL: as above.

57.9
SAND: fine-medium: loose: wet.

58.0
TILL: as above.

58.6

58.6-59.0 = SILT: firm to soft: wet.
59.0-59.4 = SAND AND GRAVEL: loose: wet.
59.4-60.1 = SAND: fine to medium grained:
loose: wet.
60.1-60.8 = SAND AND GRAVEL: loose: wet.
60.8-61.0 = clay: gray.
61.0-63.9 = SAND AND GRAVEL: gray: mostly med-
ium grained sand, some gravel,
trace small pebbles: loose: wet.

SS ML 59.0-63.9
4.0' zone of 3' net sd
+ top

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-283C

CT: Comprehensive Monitoring Program

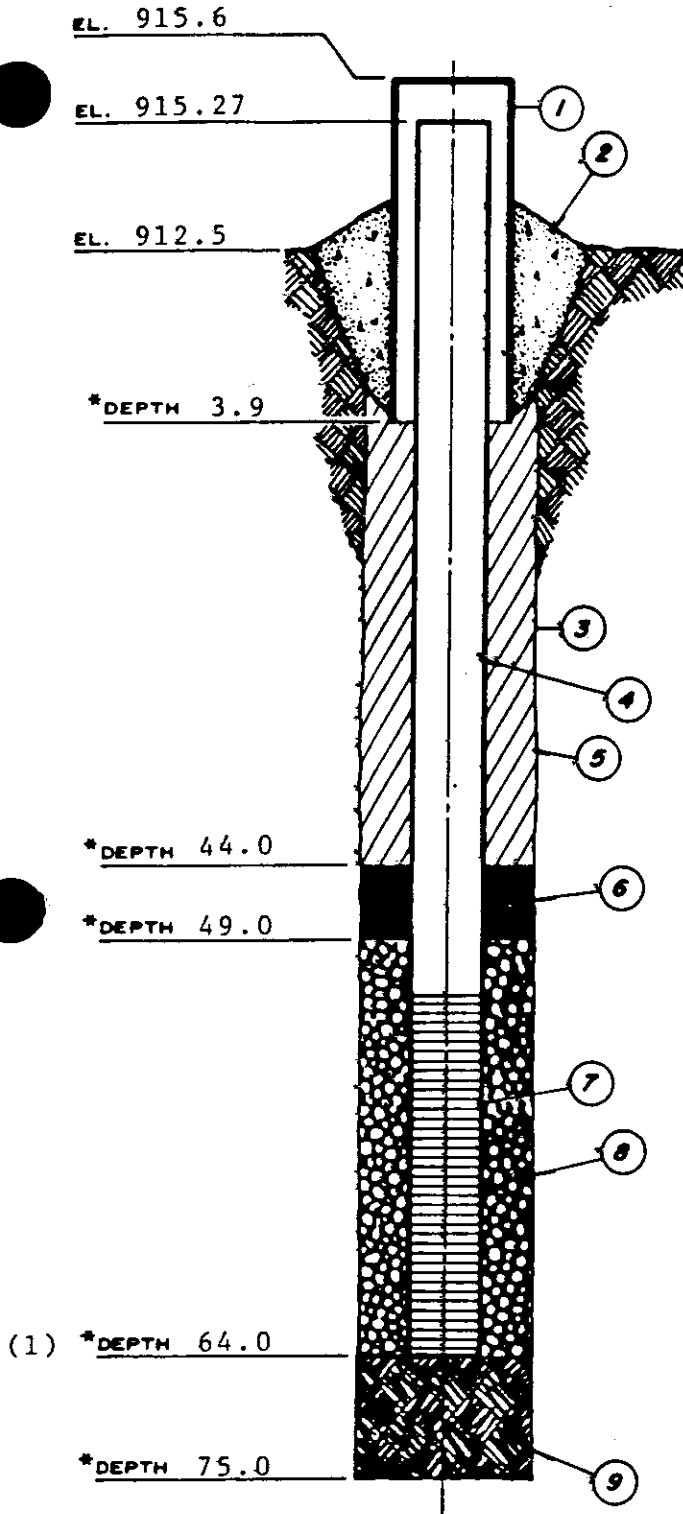
LOCATION: N: 4433.97 E: 7524.92

				BOREHOLE LOG		
DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
63		17		SAND AND GRAVEL: continued.		
		27				
64	S-10	41	20	TILL: green/gray: mostly clay, some silt, trace gravel and small pebbles: hard: dry to moist.		
		60				
65		18				
		30				
66	S-11	34	11			
		44				
67		9				
		15				
68	S-12	25	24			
		40				
69		10				
		14				
70	S-13	22	24			
		23				
71		8		firm, moist. green/mottled gray		
		12				
72	S-14	15	24			
		20				
73		7				
		9				
74	S-15	10	24			
		11				
				Total Sample Depth = 75 Feet		

REMARKS:

MONITOR WELL COMPLETION REPORT :

WELL № MP-283C JOB № 321-136
 PROJECT Comprehensive Monitoring Program
CECOS - Aber Road



*Depth in feet below grade.

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-284

PURPOSE: Comprehensive Monitoring Program

LOCATION: N: 8262.89 E: 8059.59

DRILL CONTRACTOR: Penn Drill

RIG TYPE: Acker AD-2 HSA

GWA GEOLOGIST: David Silbaugh/Scott Beasley

DRILLER: Earl Dye

DATE START: 4 /14/89

DATE FINISH: 4 /19/89

GRADE ELEVATION: 915.1

TOTAL DEPTH: 125.2 FT.

CASING TYPE: 316 Stainless Steel

SCREEN TYPE: 316 Stainless Steel

SCREENED INT: 118.1-123.1

GROUND WATER DATA

				CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	REMARKS	TYPE	NX	Splt Sp	
04/27/89	1737	96.05		DIAMETER		31n OD	21n OD
05/04/89	-	55.30		HAMMER			3001b
/ /				FALL			30in

BOREHOLE LOG

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
1	S-1	1/12 1	24	TOPSOIL: brown: mostly silt and clay, few gravel and sand: soft: moist. 0.9		
2		2 1				
3	S-2	2 2	22			
4		2 1				
5	S-3	1 2	24			
6		1 1				
7	S-4	1 2	24			

REMARKS: Located off-site, 175 ft. north of MP-272.
TOC Elevation (measuring reference point) 916.97 ft. (5/10/89)

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
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JOB NO: 321-136

BOREHOLE: MP-284

PURPOSE: Comprehensive Monitoring Program

LOCATION: N: 8262.89 E: 8059.59

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
8		2				
		9		8.5		
9	S-5	21	24	SAND AND GRAVEL: brown: mostly fine to coarse sand, little gravel: dense: moist to wet: coarsens downward.	Water in hole 9-10 ft.	
		26		9.2		
10				GLACIAL TILL: gray: mostly silt and clay, few gravel, trace fine to coarse sand and small pebbles: hard: dry to moist.		
11	S-6	18	24			
		19				
12		7				
		17				
13	S-7	22	24	Trace rock fragments.		
		28		Coarse sand laminations common 13.6-13.8ft.		
14		13				
		26		14.5		
15	S-8	13	24	SAND: gray: mostly fine to coarse sand, few gravel: loose: moist: silty at base.		
		24		15.0		
16				GLACIAL TILL: as above.		
		18		16.0		
17	S-9	22	22	CLAY, SAND AND GRAVEL MIXED: loose: wet; soupy consistency: augered material?	Water in hole 16-18 feet, auger cuttings wet.	
		39		16.7		
18		11		GLACIAL TILL: gray: as above.		
		16				
19	S-10	15	24			
		24				

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
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JOB NO: 321-136

BOREHOLE: MP-284

PURPOSE: Comprehensive Monitoring Program

LOCATION: N: 8262.89 E: 8059.59

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
20		32		GLACIAL TILL: continued. Color change to brown at 20 feet.		
		25				
21	S-11	18	24			
		18				
22		10		Rock. fragments common.		
		16				
23	S-12	12	24			
		18				
24		30		Color change to gray at 27 feet.		
		23				
25	S-13	12	24			
		15				
26		8				
		11				
27	S-14	15	24			
		11				
28		15				
		5				
29	S-15	13	24			
		23				
30		5				
		7				
31	S-16	9	24			
		10				

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
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JOB NO: 321-136

BOREHOLE: MP-284

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 8269.89 E: 8059.59

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG				
				LITHOLOGIC DESCRIPTION	REMARKS	LOG		
32		7		GLACIAL TILL: continued.	Slipped part of sample. no change in drilling rate.			
		7						
33	S-17	9	24					
		10						
34		7						
		9						
35	S-18	12	10					
		12						
36		7						
		6						
37	S-19	10	24					
		7						
38		WOR/6		Firm 38-39 feet.				
		3						
39	S-20	3						
		9	24					
40		2						
		2						
41	S-21	6	24					
		8						
42		WOR/6		Firm 42-42.5 feet.				
		5						
43	S-22	6	24					
		12						
44								

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
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JOB NO: 321-136

BOREHOLE: MP-284

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 8262.89 E: 8059.59

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
44		7		GLACIAL TILL: continued.		
		11				
45	S-23	11	24	Rock fragments common.		
		11				
46		11				
		14				
47	S-24	13	24			
		19				
48		7			Hard drilling.	
		9				
49	S-25	11	24			
		14				
50		5				
		20				
51	S-26	11	24	Rock fragments common.		
		12				
52		12				
		16				
53	S-27	20	18	Rock fragments common.	Add 5 gals. of water to hole.	
		14				
54		8				
		7				
55	S-28	6	24			
		10				
56						

REMARKS:

GROUND WATER ASSOCIATES
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JOB NO: 321-136

BOREHOLE: MP-284

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 8262.89 E: 8059.59

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
56		5		GLACIAL TILL: continued.		
		5				
57	S-29	6	24			
		7				
58		5				
		5				
59	S-30	8	24			
		9				
60		6				
		7				
61	S-31	12	24			
		19				
62		4		61.2 SAND AND GRAVEL: gray: mostly fine to coarse sand, few gravel: loose: wet: clean: silty fine sand 61.2-61.4: silty 62.3-62.5.		
		5				
63	S-32	12	24			
		22				
64		7		62.7 GLACIAL TILL: olive green: mostly silt and clay, few gravel and small pebbles, trace fine to coarse sand: hard to very hard: dry to moist.		
		7				
65	S-33	11	24			
		8				
66		7				
		12				
67	S-34	18	24			
		24			Hard drilling	

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
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JOB NO: 321-136

BOREHOLE: MP-284

P T: Comprehensive Monitoring Program

LOCATION: N: 8262.89 E: 8059.59

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
68		11		GLACIAL TILL: continued.	Add 15 gals. water to hole.	
		12				
69	S-35	12	24			
		11				
70		5				
		13				
71	S-36	12	18			
		13				
72		5				
		7				
73	S-37	9	24			
		8				
74		4				
		5				
75	S-38	7	24			
		8				
76		2				
		4				
77	S-39	7	24			
		8				
78		1		Rock fragments common.		
		2				
79	S-40	5	24			
		16				
80						

REMARKS:

GROUND WATER ASSOCIATES
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JOB NO: 321-136

BOREHOLE: MP-284

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 8262.89 E: 8059.59

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
80		6		GLACIAL TILL: continued.	Added 15 gals. water to hole.	
		5				
81	S-41	9	24			
		9				
82		5		87.1-87.3- SAND AND GRAVEL: brown: mostly fine to coarse sand with some gravel: loose: wet.		
		8				
83	S-42	17	20			
		30				
84		4				
		6				
85	S-43	10	20			
		40				
86		35				
		42				
87	S-44	12	24			
		16				
88		5				
		6				
89	S-45	7	20			
		9				
90		5				
		6				
91	S-46	7	10			
		5				
92						

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
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JOB NO: 321-136

BOREHOLE: MP-284

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 8262.89 E: 8059.59

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
92		4		GLACIAL TILL: continued.		
		5				
93	S-47	7	21			
		10				
94		4				
		6				
95	S-48	10	20			
		10				
96		6				
		6				
97	S-49	10	24			
		10				
98		5				
		4				
99	S-50	6	20			
		7				
100		3				
		5				
101	S-51	4	24			
		5				
102		2				
		3				
103	S-52	8	24			
		5				

REMARKS:

GROUND WATER ASSOCIATES
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JOB NO: 321-136

BOREHOLE: MP-284

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 8262.89 E: 8059.59

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
104		2		GLACIAL TILL: continued.		
		14				
105	S-53	10	24			
		10				
106		4				
		5				
107	S-54	7	24			
		7				
108		2				
		3				
109	S-55	7	24			
		9				
110		3				
		4				
111	S-56	6	24			
		6				
112		5				
		4				
113	S-57	7	24			
		9				
114		3				
		5				
115	S-58	5	24			
		6				

REMARKS:

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JOB NO: 321-136

BOREHOLE: MP-284

PROJECT: Comprehensive Monitoring Program

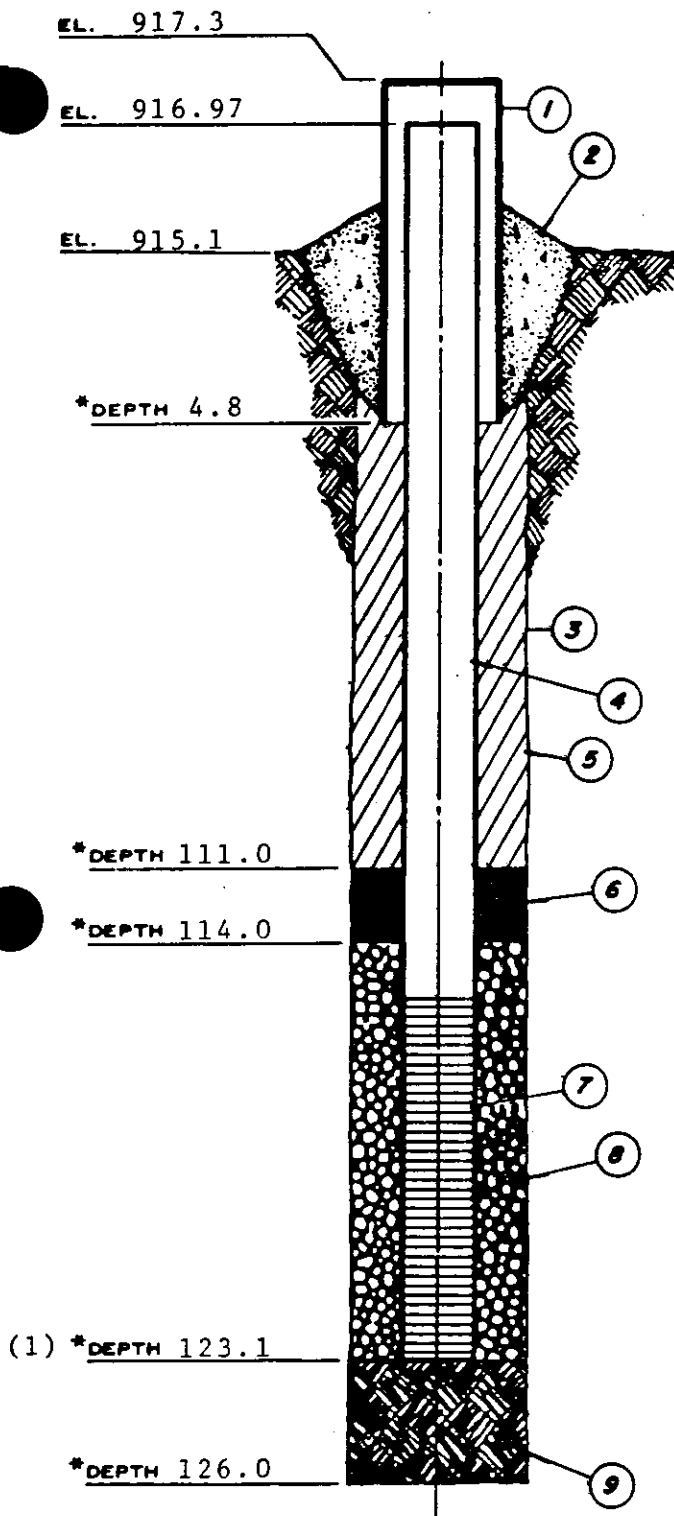
LOCATION: N: 8262.89 E: 8059.59

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
116		2		GLACIAL TILL: continued.		
		3				
117	S-59	10	24			
		11				
118		2				
		2				
119	S-60	8	21			
		9				
120						
121				120.2 BEDROCK: limestone interbedded with shale: gray: fossiliferous, thin to medium limestone interbedded with thin, black shale.	Core interval= 120.5-125.2ft REC - 100% ROD - 10%	
122						
123						
124						
125						
				Total Depth = 125.2 ft.		

REMARKS:

MONITOR WELL COMPLETION REPORT :

WELL № MP-284 JOB № 321-136
 PROJECT Comprehensive Monitoring Prog.
CECOS - Aber Road



*Depth in feet below grade.

1. PROTECTIVE CASING I.D. 4 INCHES.
2. SURFACE SEAL TYPE Concrete
3. BOREHOLE DIAMETER 10 INCHES.
4. RISER PIPE:
 - a. Type 316 Stainless Steel
 - b. I.D. 2 INCHES
 - c. Length 120 FEET
 - d. Joint Type Flush Thread
5. BACKFILL:
 - a. Type 5% Bentonite Cement Grout
 - b. Installation Side Discharge Tremie
6. Type of SEAL Volclav Grout
7. SCREEN
 - a. Type 316 Stainless Steel
 - b. I.D. 2 INCHES
 - c. Slot Size 0.010 INCHES
 - d. Length 5 FEET
8. SCREEN FILTER TYPE #4 Silica Sand
9. BACKFILL TYPE Cuttings and #4 Silica Sand
 - (1) 2.5 foot reservoir at bottom of screen

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
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JOB NO: 321-136

BOREHOLE: MP-284B

PURPOSE: Comprehensive Monitoring Program

LOCATION: N: 8254.28 E: 8054.09

DRILL CONTRACTOR: Penn Drill

RIG TYPE: Acker AD-2 HSA

GWA GEOLOGIST: Scott A. Beasley

DRILLER: Earl Dye

DATE START: 4 /25/89

DATE FINISH: 4 /25/89

GRADE ELEVATION: 915.2

TOTAL DEPTH: 20 ft.

CASING TYPE: 316 Stainless Steel

SCREEN TYPE: 316 Stainless Steel

SCREENED INTERVAL: 13.2-18.2

GROUND WATER DATA

DATE	TIME	DEPTH	REMARKS	TYPE	CASING	CORE	SAMPLER	TUBE
04/27/89	1735	2.28		DIAMETER			SS	
05/04/89	-	2.11		HAMMER			3001b.	
/ /				FALL			30in.	

BOREHOLE LOG

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
				0-10 feet augered without sampling. see WELL LOG MP-284 for lithologic description.		
10		8				
		16				
11	S-1	15	24	GLACIAL TILL: gray: mostly silty clay, some fine to coarse sand and gravel: firm to hard -moist.		
		24				
12		5				
		10				
13	S-2	17	24			
		24				
14		10				
		17				
15	S-3	19	21	14.9-15.2 - SAND, brown, fine to coarse, loose, wet.		
		21				

REMARKS: Located off-site, 175 ft. north of MP-272
TOC Elevation (measuring reference point) 916.95 ft. (5/10/89)

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
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JOB NO: 321-136

BOREHOLE: MP-284B

CT: Comprehensive Monitoring Program

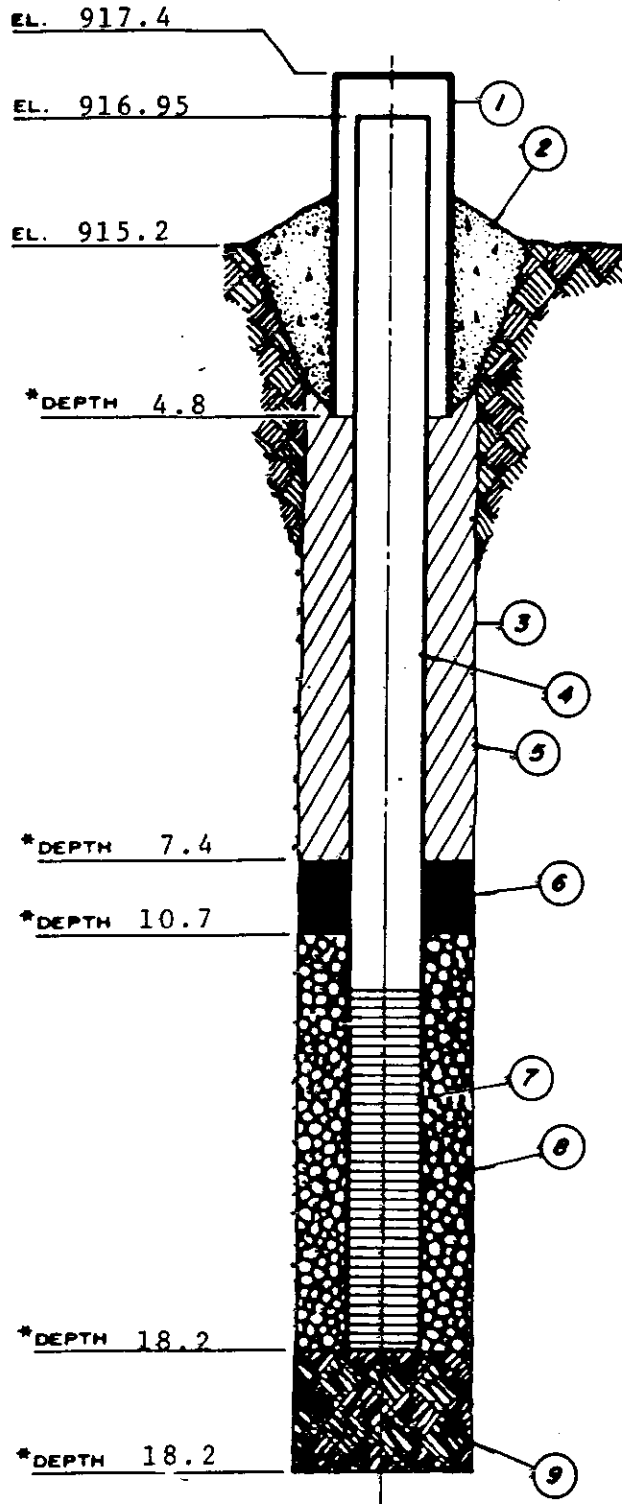
LOCATION: N: 8254.28 E: 8054.09

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
16		13		GLACIAL TILL: continued.		
		19				
17	S-4	45	24			
		43				
18		18		GLACIAL TILL: continued.		
		28				
19	S-5	26	24			
		26				
20				Sampled to 20 ft., Augered to 18 ft.		

REMARKS:

MONITOR WELL COMPLETION REPORT :

WELL N^o MP-284B JOB N^o 321-136
 PROJECT Comprehensive Monitoring Prog
CECOS - Aber Road



1. PROTECTIVE CASING I.D. 6 INCHES.
2. SURFACE SEAL TYPE Concrete
3. BOREHOLE DIAMETER 12 INCHES.
4. RISER PIPE:
 - a. Type 316 Stainless Steel
 - b. I.D. 4 INCHES
 - c. Length 15 FEET
 - d. Joint Type Flush Thread
5. BACKFILL:
 - a. Type 5% Bentonite Cement Grout
 - b. Installation Side Discharge Tremie
6. Type of SEAL Bentonite Pellet
7. SCREEN
 - a. Type 316 Stainless Steel
 - b. I.D. 4 INCHES
 - c. Slot Size 0.010 INCHES
 - d. Length 5 FEET
8. SCREEN FILTER TYPE #4 Silica Sand
9. BACKFILL TYPE Cuttings and #4 Silica Sand

*Depth in feet below grade.

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
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JOB NO: 321-136

BOREHOLE: MP-285

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 7653.86 E: 7316.79

DRILL CONTRACTOR: Penn Drill

RIG TYPE: Acker AD-2 HSA

GWA GEOLOGIST: David Lawton

DRILLER: Bernie Gollihue

DATE START: 4 /15/89

DATE FINISH: 4 /19/89

GRADE ELEVATION: 915.2

TOTAL DEPTH: 136'

CASING TYPE: 315 Stainless Steel

SCREEN TYPE: 316 Stainless Steel

SCREENED INTERVAL: 133'-123'

GROUND WATER DATA

DATE	TIME	DEPTH	REMARKS	TYPE	CASING	CORE	SAMPLER	TUBE
04/24/89	0835	31.75	before development	DIAMETER		NX	Splt Sp	
05/04/89	-	23.65		HAMMER			300lb.	
/ /				FALL			30in.	

BOREHOLE LOG

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
1	S-1	2 1 1 1	24	TOPSOIL: brown: mostly silty clay: moist. SILTY CLAY: tan/gray: soft: moist.		
2		1 1				
3	S-2	2 2	18			
4		2 2				
5	S-3	3 3	24	soft-firm black carbonaceous material		
6		2 2				
7	S-4	4 11	24	SAND: fine, silty, few clay: loose-dense: wet. 7.1 7.9		

REMARKS: Located off-site approximately 900 ft. south of former Lushek barns
TOC Elevation (measuring reference point) 917.02 ft. (5/10/89)

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JOB NO: 321-136

BOREHOLE: MP-285

PURPOSE: Comprehensive Monitoring Program

LOCATION: N: 7653.86 E: 7316.79

				BOREHOLE LOG		
DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
8		10		TILL: tan/gray: silty, few gravel and small pebbles, trace rock fragments: firm-hard: dry to moist.		
		11				
9	S-5	16	24			
		17				
10		7		10.1		
		20		Fine silty SAND: loose: wet.		
11	S-6	13	24	10.9		
		22		TILL: gray: silty, clayey: gray: with few sand gravel, trace pebbles. Hard: dry-moist.		
12		9				
		13				
13	S-7	18	24			
		15				
14		3				
		7				
15	S-8	9	24			
		11				
16		5				
		8				
17	S-9	9	24			
		8				
18		5		18.8-18.9 Sand, medium to coarse grained, wet.		
		6				
19	S-10	8	24			
		9				
20						

REMARKS:

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JOB NO: 321-136

BOREHOLE: MP-285

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 7653.86 E: 7316.79

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
20		5		SAND: most fine sand, some silt, few clay: loose: wet. coarse at base		
		8				
21	S-11	12	24			
		14				
				21.4		
22		15		TILL: gray: mostly silt and clay, few gravel and small pebbles: hard: dry -moist. 23.3-23.4 coarse sand, wet.		
		22				
23	S-12	29	24			
		27				
24		10				
		22				
25	S-13	34	24			
		155/4				
26		38				
		129				
27	S-14	133	24			
		105/4				
28		22				
		40				
29	S-15	71	24			
		126				
30		17				
		44				
31	S-16	83	24			
		66				
32						

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-285

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 7653.86 E: 7316.79

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
32		21		TILL: continued.		
		27				
33	S-17	31	24			
		61		33.3		
				SAND: fine grained with some silt, trace clay: loose: wet.		
34		10				
		17				
35	S-18	20	24	35.4 - grading to silt with trace-few clay		
		24				
36		19				
		11				
37	S-19	14	24			
		25		37.3		
				TILL: gray: hard: as above.		
38		1		38.1		
		2				
39	S-20	2	24	SAND AND GRAVEL: silty; loose: wet. Grading downward to silt.		
		20		39.5		
40		11		CLAY: gray: soft-firm; plastic		
		20		40.2		
				SAND AND GRAVEL: coarse: loose; wet.		
41	S-21	25	24	40.7		
		43		TILL: gray: hard, as above.		
42		14				
		21				
43	S-22	24	24	42.9		
		47		SAND AND GRAVEL: coarse: loose; wet.		
				43.4		

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-285

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 7653.86 E: 7316.79

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
44		19		TILL: gray: mostly silt and clay, few gravel: hard: dry to moist.		
		33				
45	S-23	65	24			
		53				
				45.6		
46		15		TILL: very silty, with few sand and gravel, trace pebbles: loose-dense; wet.		
		24				
47	S-24	35	20			
		45				
				46.4		
48		11		TILL: gray: mostly silt and clay, few sand and gravel: hard: moist.		
		12				
49	S-25	16	22			
		19				
50		3		47.7-47.9 Sand: medium to coarse, loose, wet.		
		8				
51	S-26	12	24			
		15				
52		11				
		15				
53	S-27	16	24			
		19				
54		9				
		11				
55	S-28	12	24			
		14				

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-285

CT: Comprehensive Monitoring Program

LOCATION: N: 7653.86 E: 7316.79

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
56		10		56-56.4 coarse sand and gravel: loose, wet.		
		13		56.4		
57	S-29	18	24	TILL: gray: hard, as above.		
		24				
58		12				
		17				
59	S-30	19	4			
		24				
60		5				
		7				
61	S-31	8	0			
		31		Limestone fragments.		
62		8				
		10				
63	S-32	11	24			
		12				
64		7				
		13				
65	S-33	12	24			
		15				
66		5				
		11				
67	S-34	11	24			
		15				

REMARKS:

4 inches of
solid recovery.
Split spoon
full of mud.

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-285

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 7653.86 E: 7316.79

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
68		7		TILL: continued.		
		12				
69	S-35	14	24			
		14				
70		5				
		8				
71	S-36	11	24			
		13				
72		8				
		13				
73	S-37	16	24			
		15				
74		8				
		10				
75	S-38	12	24			
		22				
76		8				
		12				
77	S-39	14	24			
		20				
78		10				
		11				
79	S-40	11	24			
		14				
80						

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-285

PCT: Comprehensive Monitoring Program

LOCATION: N: 7653.86 E: 7316.79

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
80		5		TILL: as above.		
		8				
81	S-41	9	24			
		14				
82		5		SILT: gray: mostly silt, few clay: soft -firm: moist-wet. 82.2 82.9 83.7		
		18				
83	S-42	40	24			
		23				
84		10		TILL: olive green: mostly silt and clay, few gravel and small pebbles: hard: dry to moist.		
		13				
85	S-43	18	22			
		21				
86		6				
		9				
87	S-44	12	24			
		18				
88		5				
		9				
89	S-45	12	24			
		19				
90		2				
		5				
91	S-46	7	24			
		13				
92						

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-285

PLOT: Comprehensive Monitoring Program

LOCATION: N: 7653.86 E: 7316.79

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
92		5		TILL: continued. firm, plastic		
		9				
93	S-47	11	24			
		13				
94		7				
		11				
95	S-48	11	24			
		12				
96		8				
		8				
97	S-49	11	24			
		14				
98		5				
		7				
99	S-50	9	24			
		12				
100		2				
		5				
101	S-51	6	24			
		9				
102		4				
		6				
103	S-52	8	24			
		11				
104						

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-285

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 7653.86 E: 7316.79

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
104		4		TILL: continued.		
		6				
105	S-53	8	24			
		11				
106		4				
		4				
107	S-54	8	24			
		12				
108		6				
		7				
109	S-55	8	14			
		9				
110		4				
		4				
111	S-56	4	20			
		5				
112		3				
		4				
113	S-57	5	24			
		6				
114		7		silty at base		
		9				
115	S-58	14	22			
		13				
116				soft-firm		

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-285

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 7653.86 E: 7316.79

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
116		3		TILL: continued.		
		3				
117	S-59	4	24			
		6				
118		3		Wet 117.6'-118'		
		3				
119	S-60	5	24			
		6				
120		2				
		4				
121	S-61	4	24			
		4				
122		3				
		4				
123	S-62	6	24	SILT: green/gray mottled: most silt, few clay: /loose.	122.8 123.3	
		11				
124		7		SAND: fine-med grained, coarse at bottom: loose: wet. Few indistinct bedding planes.	124.9	
		10				
125	S-63	38	24	GRAVEL: with some pebbles: few-trace clay (dirty): wet.	125.9	
		79				
126		4		Shale boulder at 125.9ft.		
		12		SAND AND GRAVEL: with some pebbles: interbedded with two clay layers at 126.4-126.6 and 127.1-127.3		
127	S-64	44	24	Broken limestone cobble at 127.3 - 127.6.	127.6	
		68				
128						

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-285

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 7653.86 E: 7316.79

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
128		21		GRAVEL: dirty:with limestone and shale fragments: trace- few clay.		
		27				
129	S-65	37	18	GRAVEL: few limestone and shale fragments, trace-few clay: dirty.		
		200				
130		114				
		115/2		SHALE: hard: competent: light-medium gray.		
131	S-66		6			
				— — CORING RUN #1 — — — — — INTERBEDDED LIMESTONE AND SHALE: SHALE: light-medium gray: hard, fissil. Thin beds at top, showing soft sediment flow character at limestone contacts.	Core Interval- 131-136 ft. REC.- 100% RQD.- 68%	
132				LIMESTONE: very fossilifereous at top, grading downward to slightly fossiliferous, more massive beds.		
133				Medium-high angle fracture at 133.4 Core breaks along bedding planes in shale.		
134						
135						
136				Total Depth - 136 Feet	Water at approx 3 FT. below grade.	

REMARKS:

MONITOR WELL COMPLETION REPORT :

EL. 917.3

EL. 917.02

EL. 915.2

*DEPTH 4.9

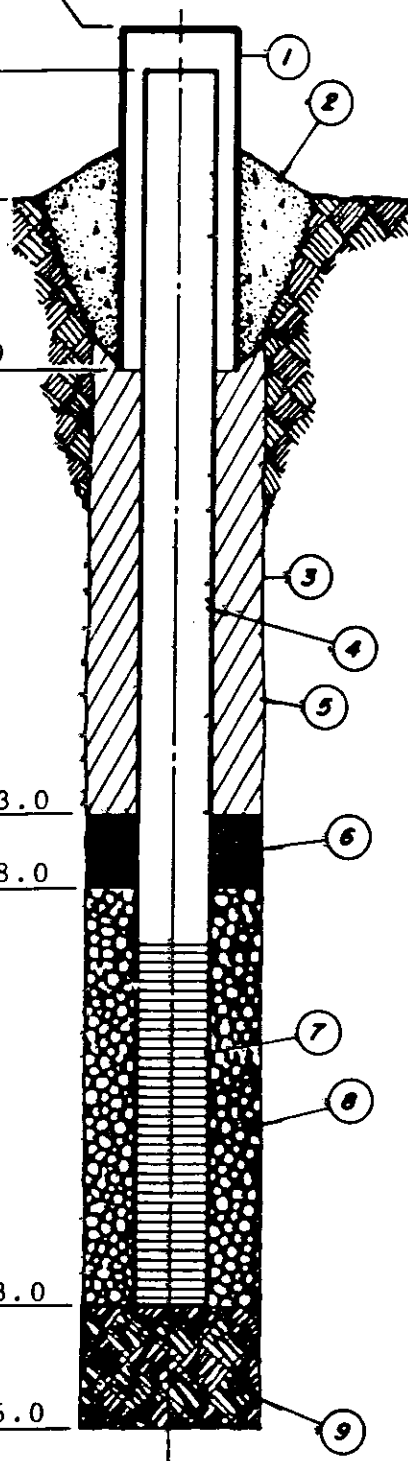
*DEPTH 103.0

*DEPTH 108.0

*DEPTH 133.0

*DEPTH 136.0

*Depth in feet below grade.



WELL № MP-285 JOB № 321-136
PROJECT Comprehensive Monitoring Pro
CECOS - Aber Road

1. PROTECTIVE CASING I.D. 4 INCHES.

2. SURFACE SEAL TYPE Concrete

3. BOREHOLE DIAMETER 10 INCHES.

4. RISER PIPE:

a. Type 316 Stainless Steel

b. I.D. 2 INCHES

c. Length 125.5 FEET

d. Joint Type Flush Thread

5. BACKFILL:

a. Type 5% Bentonite Cement Grout

b. Installation Side Discharge Tremie

(1) 6. Type of SEAL 48 Gal. Volclay Grout

7. SCREEN

a. Type 316 Stainless Steel

b. I.D. 2 INCHES

c. Slot Size 0.010 INCHES

d. Length 10 FEET

8. SCREEN FILTER TYPE #4 Silica Sand

9. BACKFILL TYPE #4 Silica Sand

(1) Volclay grout substituted for bentonite pellets due to depth of well and height of water column present.

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

Page 1 of 3

JOB NO: 321-136

BOREHOLE: MP-285A

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 7658.79 E: 7313.00

DRILL CONTRACTOR: Penn Drill

RIG TYPE: Acker AS-2 HSA

GWA GEOLOGIST: David Silbaugh

DRILLER: Bernie Gollihue

DATE START: 4 /24/89

DATE FINISH: 4 /25/89

GRADE ELEVATION: 914.7

TOTAL DEPTH: 45.0 ft.

CASING TYPE: 316 Stainless Steel

SCREEN TYPE: 316 Stainless Steel

SCREENED INTERVAL: 32.5-37.5

GROUND WATER DATA

DATE	TIME	DEPTH	REMARKS	TYPE	CASING	CORE	SAMPLER	TUBE
04/27/89	1712	7.09	Before Develop.	DIAMETER			Splt Sp	
05/04/89	-	7.11		HAMMER			300lb.	
/ /				FALL			30 in.	

BOREHOLE LOG

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
				0-23 feet augered without sampling, see well log MP-285 for lithologic description.		
23		15				
		17				
24	S-1	20	24	GLACIAL TILL: gray: mostly silt and clay, few gravel, trace fine to coarse sand and small pebbles: hard to very hard: dry to moist.	Water in hole at 23 ft.	
		28				
25		23				
		64				
26	S-2	59	18		No penetration over 20 blows.	
		20/0				
27		28				
		70				
28	S-3	47	18	Till becomes sandy at 28 ft.	No penetration over 20 blows.	
		20/0				

REMARKS: Located off-site approximately 800 feet south of former Lushek barns.
TOC Elevation (measuring reference point) 917.02 ft. (5/10/89)

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-285A

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 7658.79 E: 7313.00

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
29		20		GLACIAL TILL, continued.		
		60				
30	S-4	112	21			
		116/4				
31		24				
		27				
32	S-5	43	24			
		68				
33				32.7		
		18		SILT: brown: dense: wet: well sorted, homogeneous.		
		16				
34	S-6	12	24	33.8		
		15		GLACIAL TILL: brown, mostly silt and clay, few gravel, trace fine to coarse sand, hard: dry to moist...grading to...		
35		4		SILTY TILL: brown: mostly silt, little to few clay, few gravel and coarse sand: very dense: moist.		
		9				
36	S-7	16	24			
		22				
37		11		37.2-37.6 Silt, dense, moist.		
		16				
38	S-8	14	21			
		15		37.8		
				GLACIAL TILL: gray: mostly silt and clay, few gravel and rock fragments, trace fine to coarse sand: hard: dry to moist.		
39		6				
		13				
40	S-9	25	22			
		42				
41						

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-285A

PROJECT: Comprehensive Monitoring Program

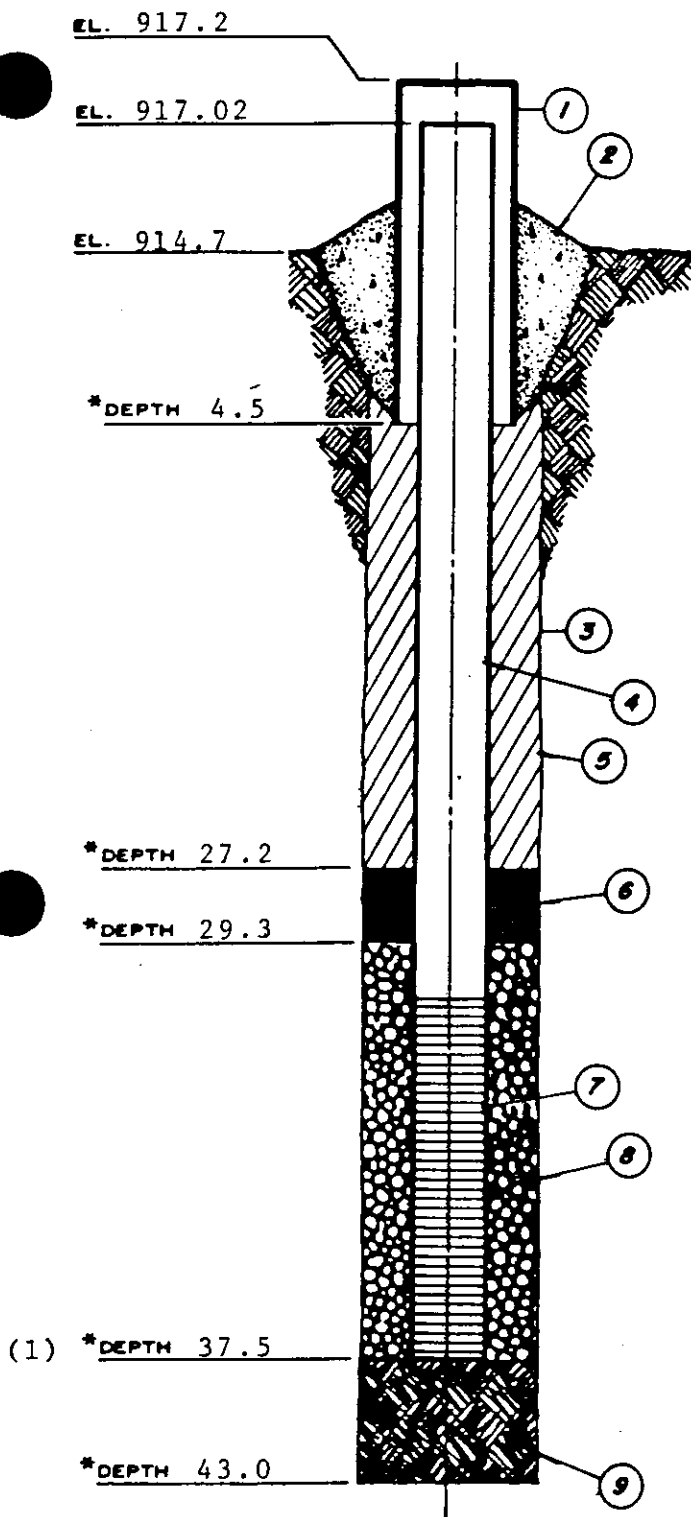
LOCATION: N: 7658.79 E: 7313.00

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
41		21		GLACIAL TILL: continued.		
		25				
42	S-10	27	24			
		41				
43		20		Augered to 43 ft., sampled to 45 ft.		
		22				
44	S-11	49	22			
		42				
45						

REMARKS:

MONITOR WELL COMPLETION REPORT :

WELL N^o MP-285A JOB N^o 321-136
 PROJECT Comprehensive Monitoring Program
CECOS - Aber Road



1. PROTECTIVE CASING I.D. 4 INCHES.

2. SURFACE SEAL TYPE Concrete

3. BOREHOLE DIAMETER 10 INCHES.

4. RISER PIPE:

a. Type 316 Stainless Steel

b. I.D. 2 INCHES

c. Length 35 FEET

d. Joint Type Flush Thread

5. BACKFILL:

a. Type 5% Bentonite Cement Grout

b. Installation Side Discharge Tremie

6. Type of SEAL Bentonite Pellet

7. SCREEN

a. Type 316 Stainless Steel

b. I.D. 2 INCHES

c. Slot Size 0.010 INCHES

d. Length 5 FEET

8. SCREEN FILTER TYPE #4 Silica Sand

9. BACKFILL TYPE Cuttings and #4 Silica Sand

(1) 2.5 foot reservoir at bottom of screen

*Depth in feet below grade.

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

Page 1 of 2

JOB NO: 321-136

BOREHOLE: MP-285B

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 7656.83 E: 7307.26

DRILL CONTRACTOR: Penn Drill

RIG TYPE: Acker AD-2 HSA

GWA GEOLOGIST: David Lawton

DRILLER: Bernie Gollihue

DATE START: 4 /17/89

DATE FINISH: 4 /18/89

GRADE ELEVATION: 915.2

TOTAL DEPTH: 27

CASING TYPE: 316 Stainless Steel

SCREEN TYPE: 316 Stainless Steel

SCREENED INTERVAL: 18'-23'

GROUND WATER DATA

GROUND WATER DATA				CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	REMARKS	TYPE		Splt Sp	
04/27/89	1711	5.71		DIAMETER		2in.0D	
05/04/89	-	5.40		HAMMER		300lb.	
/ /				FALL		30in.	

BOREHOLE LOG

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
15				Augered 0-15 ft. without sampling. For lithology see MP-285 log.		
16	S-1	5 6 22 25	22	TILL: tan-brown: silty, with few sand and gravel, trace rock fragments: hard: dry to moist.		
17						
18	S-2	3 8 9 8	24			
19						
20	S-3	6 11 11 14	13	19.7 SILT: brown: most silt, trace clay: coarsening downward to mostly fine SAND: well sorted: loose wet.		

REMARKS: Located off-site approximately 800 feet south of former Lushek barns.
TOC Elevation (measuring reference point) 916.98 ft. (5/10/89)

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

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JOB NO: 321-136

BOREHOLE: MP-285B

PROJECT: Comprehensive Monitoring Program

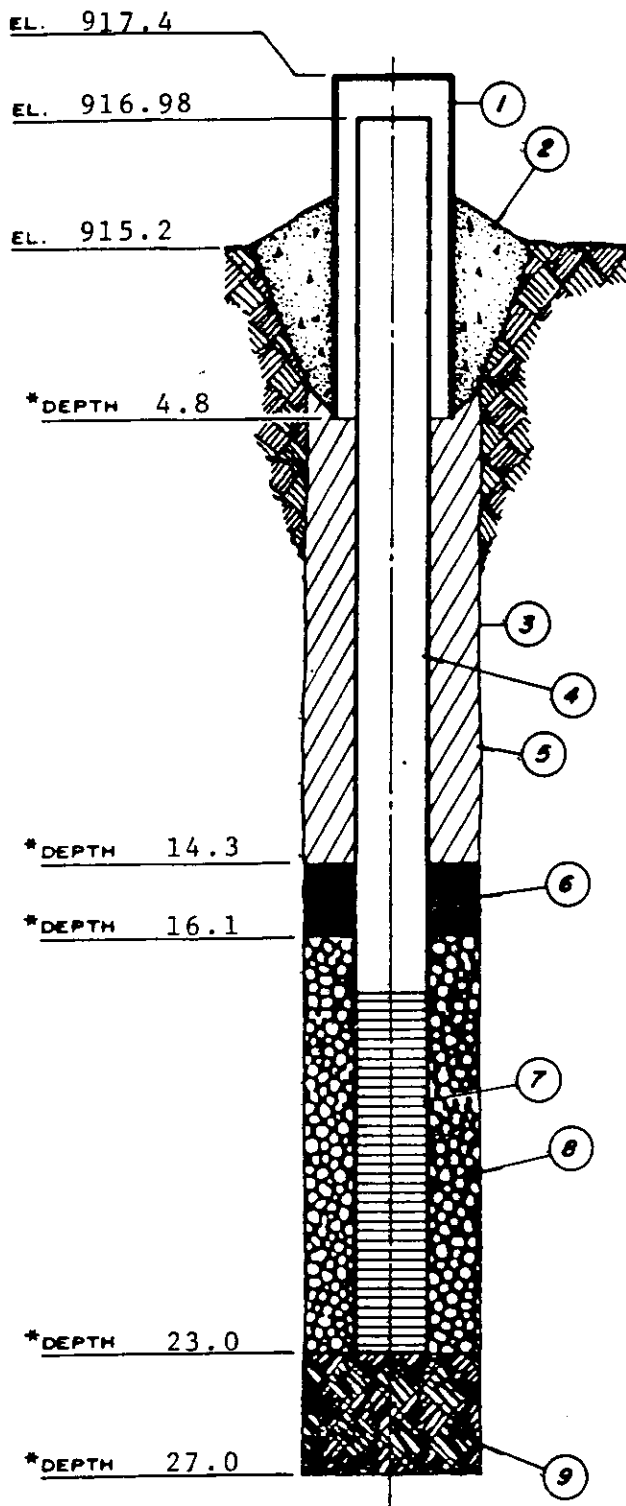
LOCATION: N: 7656.83 E: 7307.26

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
21		17		SILT: continued		
		25				
22	S-4	23	24	21.9		
		23		TILL: brown: mostly silt and clay, few 22.3 gravel and fine to coarse sand: hard: dry to moist: silt dense 22.3-22.4 22.4		
23		7				
		12				
24	S-5	17	24			
		23				
25		16				
		22				
26	S-6	112	24			
		149				
27				Augered to 25 ft.- Sampled to 27 ft.		

REMARKS:

MONITOR WELL COMPLETION REPORT :

WELL N^o MP-285B JOB N^o 321-136
 PROJECT Comprehensive Monitoring Prog
CECOS - Aber Road



*Depth in feet below grade.

1. PROTECTIVE CASING I.D. 6 INCHES.
2. SURFACE SEAL TYPE Concrete
3. BOREHOLE DIAMETER 12 INCHES.
4. RISER PIPE:
 - a. Type 316 Stainless Steel
 - b. I.D. 4 INCHES
 - c. Length 20 FEET
 - d. Joint Type Flush Thread
5. BACKFILL:
 - a. Type 5% Bentonite Cement Grout
 - b. Installation Side Discharge Tremie
6. Type of SEAL Bentonite Pellet / Volclay Grout
7. SCREEN
 - a. Type 316 Stainless Steel
 - b. I.D. 4 INCHES
 - c. Slot Size 0.010 INCHES
 - d. Length 5 FEET
8. SCREEN FILTER TYPE #4 Silica Sand
9. BACKFILL TYPE Cuttings and #4 Silica Sand

JOP NO: 321-136

BOREHOLE: MP-2B6C

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 6560.17 E: 6981.01

DRILL CONTRACTOR: Penn Drill

RIG TYPE: Mobile B-53 ATV

GWA GEOLOGIST: Scott A. Beasley

DRILLER: Jim Saccant

DATE START: 4 /2 /89

DATE FINISH: 4 /15/89

GRADE ELEVATION: 906.1

TOTAL DEPTH: 66ft.

CASING TYPE: 316 Stainless Steel

SCREEN TYPE: 316 Stainless Steel

SCREENED INTERVAL: 56.7-61.7

GROUND WATER DATA

DATE	TIME	DEPTH	REMARKS	TYPE	CASING	CORE	SAMPLER	TUBE
04/27/89	1701	28.89		DIAMETER			SS	
05/04/89	-	28.86		HAMMER			300lb	
/ /				FALL			30in.	

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
1	S-1	1	22	GLACIAL TILL: tan/brown: mostly silty clay. little sand, few gravel and small pebbles: firm: moist.		
		1				
		1				
		1				
2	S-2	1	20	Gray Mottling		
		1				
3		2				
		3				
4	S-3	2	24			
		3				
5		3				
		2				
6	S-4	2	23			
		4				
7		8				
		17				

REMARKS: Located off-site approximately 100 feet north of NE corner of SCMF No. 7
TOC Elevation (measuring reference point) 908.81 ft. (5/10/89)

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 W. State Street
Westerville, Ohio 43081

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NO: 321-136

BOREHOLE: MP-2B6C

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 6560.17 E: 6981.01

DEPTH -B	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
		5		GLACIAL TILL: continued.		
		12				
9	S-5	36	24			
		47				
10		17		SAND: brown: medium grained: loose: wet.		
		36				
11	S-6	46	24			
		27				
12		10		GLACIAL TILL: gray: mostly clayey silt; some fine to coarse sand, gravel and small pebbles: hard: moist.		
		21				
	S-7	24	24			
		24				
14		10				
		13				
15	S-8	14	24			
		19				
16		12				
		14				
17	S-9	14	23			
		17				
18		7				
		11				
19	S-10	15	24			
		19				
20						

REMARKS:

JO NO: 321-136

BOREHOLE: MP-286C

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 6560.17 E: 6981.01

				BOREHOLE LOG												
DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG										
20		21		GLACIAL TILL: continued. 20.4-20.6 Sand/Gravel: brown: mostly med-coarse sand with some gravel: loose: wet.	Clay content is minimal in some till samples.											
		37														
21	S-11	45	21													
		86														
22		12														
		21														
23	S-12	40	16													
		37														
24		8														
		12														
25	S-13	18	24													
		20														
26		5														
		11														
27	S-14	15	24													
		15														
28		10														
		11														
29	S-15	15	24													
		19														
30		9														
		11														
31	S-16	17	24													
		17														
32																

REMARKS:

VO: 321-136

BOREHOLE: MP-286C

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 6560.17 E: 6981.01

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
32		5		GLACIAL TILL: continued.		
		12				
33	S-17	17	21			
		23				
34		4				
		11				
35	S-18	17	24			
		26				
36		5				
		12				
	S-19	14	24			
		18				
38		8				
		11				
39	S-20	14	24			
		17				
40		7				
		12				
41	S-21	19	17			
		17				
42		8				
		12				
43	S-22	14	22			
		27				
44						

REMARKS:

01): 321-136

BOREHOLE: MP-286C

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 6560.17 E: 6981.01

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
44		4		GLACIAL TILL: continued.		
		11				
45	S-23	11	21			
		25				
46		5				
		12				
47	S-24	13	24			
		18				
48		7				
		13				
49	S-25	14	18			
		17				
50		4				
		7				
51	S-26	8	23			
		14				
52		7				
		14				
53	S-27	17	23			
		27				
54		10				
		17				
55	S-28	17	24			
		21				
56				SAND AND GRAVEL: brown: mostly coarse sand and gravel, few angular rock fragments: loose: wet.		

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists
6 1/2 N. State Street
Westerville, Ohio 43081

Page 6 of 6

NO: 321-136

BOREHOLE: MP-286C

PROJECT: Comprehensive Monitoring Program

LOCATION: N: 6560.17 E: 6981.01

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
56		7		SAND AND GRAVEL: continued.		
		15				
57	S-29	20	24			
		31				
58		25				
		40				
59	S-30	45	24			
		44				
60		56				
		33				
	S-31	27	21			
		54				
62		19		GLACIAL TILL: mostly clayey silt; some fine to coarse sand and pebbles: hard to very hard: moist.		
		33				
63	S-32	46	20			
		80				
64		18				
		26				
65	S-33	49	20			
		48				
66				Total Sample Depth - 66 Feet		

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists

Page 1 of 4

JOB NO: 321-104

BOREHOLE: MP-287

PROJECT: CECOS RFI

LOCATION: N 4806.45 E 4540.15

DRILL CONTRACTOR MATHIS

RIG TYPE: CME 55 AUGER RIG

GWA GEOLOGIST: D.L.LAWTON

DRILLER: FRANK LOWE

DATE START: 09/12/89

DATE FINISH: 09/14/89

GRADE ELEVATION: 885.28

TOTAL DEPTH: 36 FEET

CASING TYPE: N/A

SCREEN TYPE: 316 STAINLESS .010 SL

SCREENED INTERVAL: 24.5-29.5

GROUND WATER DATA					CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	REMARKS	TYPE		NX	SPL SP	
/ /				DIAMETER		2 INCH	2 INCH	
/ /				HAMMER			140/300	
/ /				FALL			30 INCH	

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG				
				LITHOLOGIC DESCRIPTION			REMARKS	LOG
		5		TOPSOIL: 0-4 inches. brown, silty clay loam. CLAY: silty, brown, with some fine sand. Firm, moist.				
		5						
		4	19					
		4						
2	S-1 VOA							
		2						
		2						
		3	5					
	S-2	4						
4								
		2						
		2						
	S-3	4	14	SAND: 1.5 inches. medium grained, with trace of coarse. Loose, with little clay. wet. TILL: brown, firm-hard, moist. Weathered.				
		11						
6								
		10						
	S-4	35	18					
		72						
		100						
8								

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists

Page 2 of 4

JOB NO: 321-104

BOREHOLE: MP-287

PROJECT: CECOS RFI 1989

LOCATION:

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
8	S-5 PP	35	14	TILL: tan/brown, moist, firm. Aggregate poorly sorted.		
		50				
		80				
		126				
10	S-6	11	8		Switched to 300# hammer	
		20				
		32				
		17				
12	S-7	12	9			
		17				
		28				
		34				
14	S-8	8	9			
		17				
		19				
		24				
16	S-9	9	12	Hard, dry/moist.		
		14				
		23				
		26				
18	S-10	13	9			
		18				
		22				
		25				
20						

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists

Page 3 of 4

JOB NO: 321-104

BOREHOLE: MP-287

PROJECT: CECOS-RFI 1989

LOCATION:

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
20	S-11	14	10			
		18				
		24				
		36				
22	S-12	9	13			
		13				
		16				
		22				
24	S-13 PP	10	13	TILL: AS ABOVE, with more clay. Firm, moist		
		13				
		16				
		19				
26	S-14	50/5	4	26.3 TOP OF ROCK	CORING RUN #1.	
				MEDIUM GRAY SHALE INTERBEDDED WITH LIMESTONE.		
				SHALE: beds .7-1.0 foot thick. Distinct horizontal/sub-horizontal laminar bedding decreasing bed thickness toward base.		
				LIMESTONE: medium-light gray, very fossiliferous at; 29.0-29.3 30.0-30.5 35.5-36.0 has indistinct laminar/thin beds.		
28						
30				Core breaks along bedding planes in shale.		
32						

REMARKS:

INT. 26-36
REC. 9.2
RQD 63%

MONITORING WELL COMPLETION REPORT

Well No. MP-287

Job No. 321-104

Project: CECOS - RFI

EL. 888.34

EL. 888.08

EL. 885.28

DEPTH 3

DEPTH 17.8

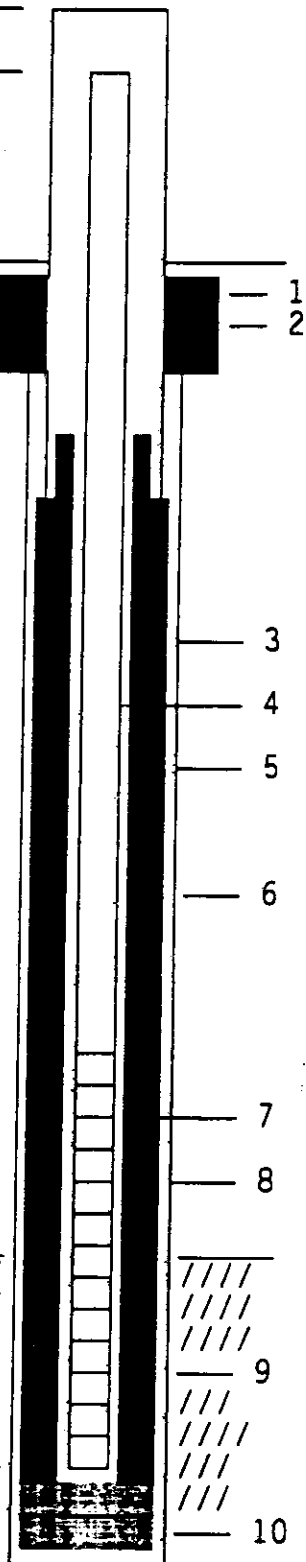
DEPTH 20.2

DEPTH 26.3

BEDROCK

DEPTH 29.5

DEPTH 36



1.) Protective Casing ID 4 inches

2.) Surface Seal Type: CONCRETE

3.) Borehole Diameter 10 inches

4.) Riser Pipe:

a) Type 316 STAINLESS STEEL

b) ID 2 inches

c) Length 27.5 feet

d) Joint Type: FLUSH THREAD

5.) Annular Backfill:

a) Type: BENTONITE/CEMENT GROUT

b) Installation: SIDE DIS. TREMIE

6.) Annular Seal:

a) Type: BENTONITE PELLETS

7.) Screen:

a) Type: 316 STAINLESS STEEL

b) ID 2 inches

c) Slot Size .010 inches

d) Length 5 feet

8.) Sand Pack: #4 SAND

9.) Reamed Diameter 6 inches

10.) Backfill Type: CUTTINGS

GROUND WATER ASSOCIATES
Consulting Hydrogeologists

Page 1 of 4

JOB NO: 321-104

BOREHOLE: MP289A

PROJECT: CECOS-RFI

LOCATION: N 5957.91 E 5819.08

DRILL CONTRACTOR MATHIS DRILLING

RIG TYPE: CME 55 HOLLOW STEM AUGER RIG

GWA GEOLOGIST: BOB LUNT

DRILLER: KENT MOORE

DATE START: 9/13/89

DATE FINISH: 9/13/89

GRADE ELEVATION: 909.94

TOTAL DEPTH: 39 FT.

CASING TYPE: N/A

SCREEN TYPE: 316 S.S., .010 SLOT

SCREENED INTERVAL: 31.5-36.5

GROUND WATER DATA

				CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	REMARKS	TYPE		SPL SP	
/ /				DIAMETER		2 INCH	
/ /				HAMMER		300#	
/ /				FALL		30 INCH	

BOREHOLE LOG

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
		1		0 - 4" TOPSOIL: brown clay		
		2		4" - CLAY: with some silt and sand.		
		2	5	occasional iron staining. Dry - moist.		
		2				
2	S-1 VOA					
		2				
		2				
		3	11	Wood fibers (roots)		
	S-2	3		UPPER WEATHERED TILL: CLAY with silt and few		
		3		sand, brown, with some iron staining.		
4						
		1				
		2				
	S-3	3	14	Roots.		
		4				
6						
		2				
		3				
	S-4 PP	4	15	Orange iron staining.		
		4				
8						

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists

Page 2 of 4

JOB NO: 321-104

BOREHOLE: MP-289A

PROJECT: CECOS-RFI

LOCATION:

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
8				TILL: as above		
	S-5	4 4 12 15	17			
10				Brown-gray mottled appearance, moist.		
	S-6	6 13 19 22	14			
12						
	S-7	11 20 46 36	17			
14						
	S-8	9 19 32 32	16			
16						
	S-9	11 23 30 29	10			
18						
	S-10 PP	10 18 28 28	15			
20						

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists

Page 3 of 4

JOB NO: 321-104

BOREHOLE: MP-289A

PROJECT: CECOS-RFI

LOCATION:

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
20				WEATHERED TILL: AS ABOVE	300# HAMMER	
	S-11	9 21 42 52	19			
22						
	S-12	7 16 22 17	14	Thin sandy till layers, in till. Moist, firm-hard.		
24						
	S-13	11 17 20 22	20			
26						
	S-14	11 13 17 25	14			
28						
	S-15	8 12 21 22	19			
30						
	S-16	15 22 27 26	17			

REMARKS:

Page 4 of 4

BOREHOLE: MP-289A

LOCATION:

[illegible]

MONITORING WELL COMPLETION REPORT

Well No. MP-289A

Job No. 321-104

Project: CECOS - RFI

EL. 913.45

EL. 913.30

EL. 909.94

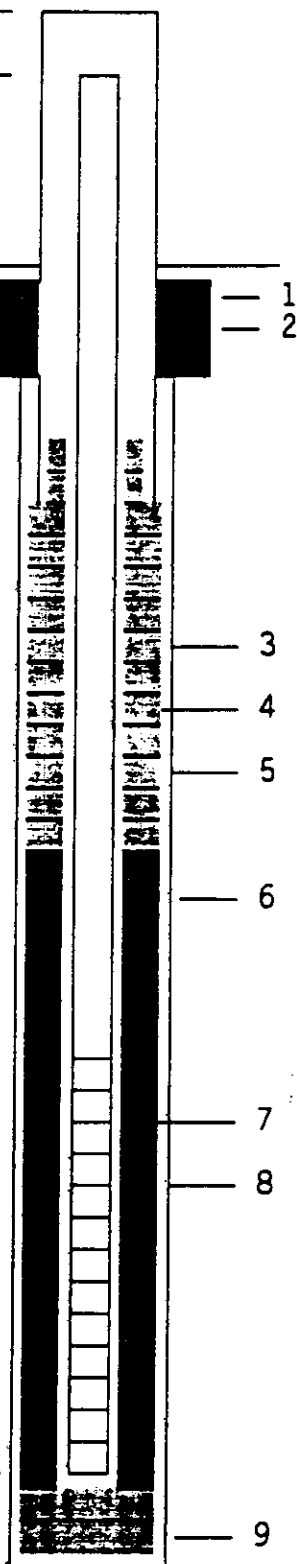
DEPTH 3

DEPTH 27.5

DEPTH 29.5

DEPTH 36.5

DEPTH 39



1.) Protective Casing ID 4 inches

2.) Surface Seal Type: Cement

3.) Borehole Diameter 10 inches

4.) Riser Pipe:

a) Type 316 Stainless

b) ID 2 inches

c) Length 35 feet

d) Joint Type: Flush Thread

5.) Annular Backfill:

a) Type: Bentonite/Cement Grout

b) Installation: Side Tremie

6.) Annular Seal:

a) Type: Bentonite Slurry

7.) Screen:

a) Type: 316 Stainless

b) ID 2 inches

c) Slot Size .010 inches

d) Length 5 feet

8.) Sand Pack: #4 Sand

9.) Backfill Type: Cuttings

2.5 Ft. Sump Below Screen

GROUND WATER ASSOCIATES
Consulting Hydrogeologists

Page 1 of 6

JOB NO: 321-104

BOREHOLE: MP290

PROJECT: CECOS-RFI

LOCATION: N 4242.76 E 5756.07

DRILL CONTRACTOR MATHIS DRILLING

RIG TYPE: CME 55 HOLLOW STEM AUGER RIG

GWA GEOLOGIST: DAVE LAWTON / BOB LUNT

DRILLER: KENT MOORE

DATE START: 09/15/89

DATE FINISH: 10/04/89

GRADE ELEVATION: 897.08

TOTAL DEPTH: 69 FT.

CASING TYPE: N/A

SCREEN TYPE: 316 S.S., .010 SLOT

SCREENED INTERVAL: 56.5-61.5

GROUND WATER DATA

GROUND WATER DATA				CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	REMARKS	TYPE	NX	SPL SP	
/ /				DIAMETER	2 INCH	2 INCH	
/ /				HAMMER		300#	
/ /				FALL		30 INCH	

BOREHOLE LOG

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
		5		0 - 8" TOPSOIL: brown, moist, firm	150# HAMMER	
		10		SILTY CLAY: tan-brown, moist, firm		
	S-1 VOA	14	12			
		11				
2				sandy at base.		
		5				
	S-2 VOA	7				
		9	14			
		14				
4				3.8'		
		13		TILL: weathered, yellow brown, firm, moist.		
	S-3 VOA	22				
		26	14			
		33				
6						
		6				
	S-4 VOA	10				
		13	10			
		16				

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists

Page 2 of 6

JOB NO: 321-104

BOREHOLE: MP-290

PROJECT: CECOS-RFI

LOCATION:

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
8	S-5 VOA	7	17	TILL: weathered, AS ABOVE.		
		13				
		22		9.2'—		
		31		SAND: medium, loose, moist.		
10	S-6 VOA	37	12	9.6'—		
		70		TILL: unweathered, medium gray, firm, moist.		
		100				
		109				
12	S-7	40	12			
		75				
		85				
		80				
14	S-8	8	24			
		20				
		60		15.5'		
		70		SAND: loose, wet.		
16	S-9 PP	12	24	Fining upward from medium-coarse at base		
		19		to fine with little clay at top.		
		30				
		28				
18	S-10	19	24	18.2'—		
		46		TILL: dark gray, firm-hard, moist.		
		70				
		70				

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists

Page 3 of 6

JOB NO: 321-104

BOREHOLE: MP-290

PROJECT: CECOS-RFI

LOCATION:

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
20					OVER AUGERED WITHOUT SAMPLING	
	S-11	16 37	6	WEATHERED TILL: AS ABOVE.		
22	S-12	15 30 40 40	12			
24	S-13	6 13 33 35	17	Sandy at 25 - 25.5 ft.		
26	S-14	26 20 22 25	11	TILL: as above	Sand above is leaking water into boring.	
28	S-15	20 22 30 35	12			
30	S-16	20 20 21 35	20			

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists

Page 4 of 6

JOB NO: 321-104

BOREHOLE: MP-290

PROJECT: CECOS-RFI

LOCATION:

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
32					OVER AUGERED WITHOUT SAMPLING	
34				TILL: as above		
	S-18	10 17 30 41	11			
36						
	S-19	20 40 40 35	11			
38						
	S-20	12 25 35 40	24			
40						
	S-21 PP	30 30 35 40	18			
42						
	S-22	10 15 20 20	19			
44				43.6'— CLAY: laminar tan-light gray firm-moist.		

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists

Page 5 of 6

JOB NO: 321-104

BOREHOLE: MP-290

PROJECT: CECOS-RFI

LOCATION:

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
44	S-23	10	12	TILL: medium-dark gray, hard moist.		
		38		With laminar - thin beds of tan-light gray slightly silty clay, firm, moist.		
		35				
		40				
46	S-24	4	18	CLAY: dark brown/gray, moist, soft, with little - few silt.		
		7				
		8				
		10				
48	S-25	5	14	Organic material 48.6'. Thin layer, woody.		
		6				
		10				
		10				
50	S-26	5	24	50.5' green/gray, soft-firm with no sand or silt.		
		7				
		9				
		4				
52	S-27	7	23			
		6				
		6				
		12				
54	S-28	4	19			
		5				
		5				
		10				
56						

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists

Page 6 of 6

JOB NO: 321-104

BOREHOLE: MP-290

PROJECT: CECOS-RFI

LOCATION:

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
56				Trace silt.		
	S-29	2 4 10 30	18			
58				57.6' SHALE: highly weathered, light-medium gray.		
	S-30	55 60 70 50		CORING RUN # 1 LIMESTONE: interbedded with soft, thin medium gray shale. Shale has laminar SHALE: has laminar bedding in part, massive, soft in rest. limestone is locally very fossiliferous.	INT. 59'-69' REC. 9' 90% RQD 37%	
60						
62						
64						
66						
				CORING TO 69'		

REMARKS:

MONITORING WELL COMPLETION REPORT

Well No. MP-290

Job No. 321-104

Project: CECOS - RFI

EL. 898.24

EL. 898.17

EL. 897.08

DEPTH 3.5

DEPTH 49

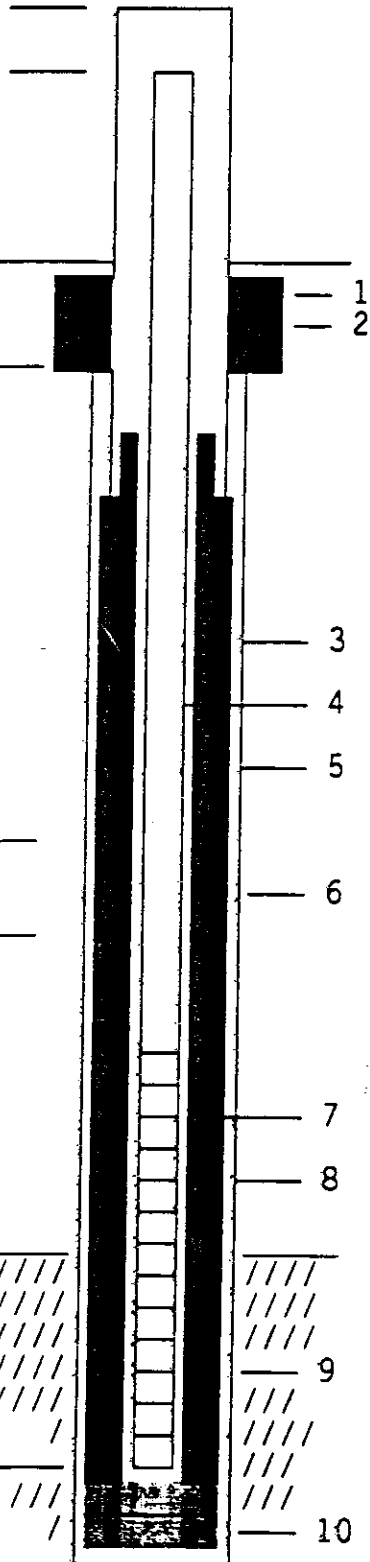
DEPTH 51

DEPTH 59

BEDROCK

DEPTH 61.5

DEPTH 69



1.) Protective Casing ID 6 inches

2.) Surface Seal Type: CONCRETE

3.) Borehole Diameter 10 inches

4.) Riser Pipe:

a) Type 316 STAINLESS STEEL

b) ID 2 inches

c) Length 57.5 feet

d) Joint Type: FLUSH THREAD

5.) Annular Backfill:

a) Type: BENTONITE/CEMENT GROUT

b) Installation: SIDE DIS. TREMIE

6.) Annular Seal:

a) Type: BENTONITE SLURRY

7.) Screen:

a) Type: 316 STAINLESS STEEL

b) ID 2 inches

c) Slot Size .010 inches

d) Length 5 feet

8.) Sand Pack: #4 SAND

9.) Reamed Diameter 6

10.) Backfill Type: CUTTINGS

GROUND WATER ASSOCIATES
Consulting Hydrogeologists

Page 1 of 3

JOB NO: 321-104		BOREHOLE: MP290A	
PROJECT: CECOS-RFI		LOCATION: N 4239.13 E 5761.99	
DRILL CONTRACTOR MATHES DRILLING		RIG TYPE: CME 55 HOLLOW STEM AUGER RIG	
GWA GEOLOGIST: BOB LUNT		DRILLER: KENT MOORE	
DATE START: 10/10/89	DATE FINISH: 10/11/89	GRADE ELEVATION: 897.21	TOTAL DEPTH: 24'
CASING TYPE: N/A		SCREEN TYPE: 316 SS. .010 SLOT	SCREENED INTERVAL: 16.5-21.5'

GROUND WATER DATA

				CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	REMARKS	TYPE		SPL SP	
/ /				DIAMETER		2 INCH	
/ /				HAMMER		300#	
/ /				FALL		30 INCH	

BOREHOLE LOG

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
<div style="text-align: center;">1</div>	S-1	2	14	TOPSOIL (FILL): dark brown silty clay, with few organic material - few-little sand and gravel, moist, firm.	150# HAMMER	
		4				
		4				
		4				
2				FOR LITHOLOGY SEE MP-290.	INTERVAL NOT SAMPLED	
4						
6				TILL: weathered, firm, moist.		
<div style="text-align: center;">8</div>	S-2	4	13			
		10				
		10				
		14				

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists

Page 2 of 3

JOB NO: 321-104

BOREHOLE: MP-290A

PROJECT: CECOS-RFI

LOCATION:

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
8				TILL: weathered, AS ABOVE.		
	S-3	8 12 30 45	20			
10				SAND: coarse, loose, wet. 9.5'		
	S-4	10 30 50 70	14	TILL: dark gray, hard, moist. 10.0'		
12						
	S-5	9 55 80 105	20			
14						
	S-6	4 25 35 85	21	SAND: coarse - fining upward. Loose, wet. 15.3'	Water in hole.	
16				Fine with little silt at top.		
	S-7	3 12 15 30	22	with few gravel.		
				with small pebbles.		
				fine - medium grained.		
18						
	S-8 PP	25 70 140 130	24	TILL: dark gray, as above, hard, moist. 18.4'		
20						

REMARKS:

JOB NO: 321-104

BOREHOLE: MP-290A

PROJECT: CECOS-RFI

LOCATION:

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
20				TILL: AS ABOVE.		
	S-9	25 60 80 60	12			
22				dark gray, hard, moist.		
	S-10	22 33 44 35	14			
24				SAMPLING TO 24'		

REMARKS:

MONITORING WELL COMPLETION REPORT

Well No. MP-290A

Job No. 321-104

Project: CECOS - RFI

EL. 898.86

EL. 898.51

EL. 897.21

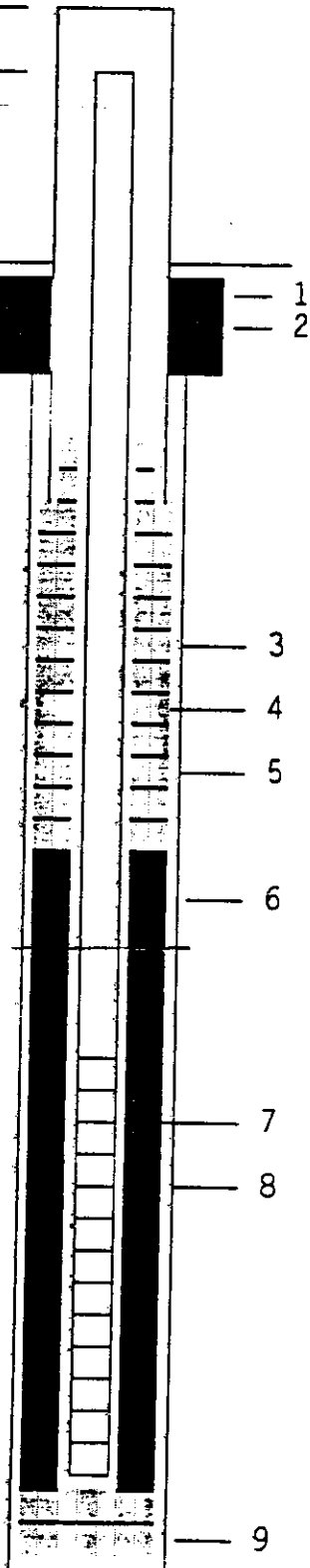
DEPTH 3

DEPTH 10.4

DEPTH 13

DEPTH 21.5

DEPTH 24



1.) Protective Casing ID 6 inches

2.) Surface Seal Type: Cement

3.) Borehole Diameter 10 inches

4.) Riser Pipe:

a) Type 316 Stainless

b) ID 2 inches

c) Length 17.5 feet

d) Joint Type: Flush Thread

5.) Annular Backfill:

a) Type: Bentonite/Cement Grout

b) Installation: Side Tremie

6.) Annular Seal:

a) Type: Bentonite Slurry

7.) Screen:

a) Type: 316 Stainless

b) ID 2 inches

c) Slot Size .010 inches

d) Length 5 feet

8.) Sand Pack: #4 Sand

9.) Backfill Type: Cuttings

2.5 Ft. Sump Below Screen

GROUND WATER ASSOCIATES
Consulting Hydrogeologists

Page 2 of 2

JOB NO: 321-104

BOREHOLE: MP-2908

PROJECT: CECOS-RFI

LOCATION:

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
8	S-5 VOA PP	5	22	TILL: weathered AS ABOVE		
		7				
		15				
		25		SAND: coarse, loose, wet. 9.5'		
10	S-6 VOA	7	16	TILL: dark gray, hard, moist.		
		50				
		175				
		80				
12	S-7	25	15			
		50				
		200				
		80				
14	S-8 PP	30	17			
		50				
		55				
		45				
16				SAMPLING TD 16'		

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists

Page 1 of 2

JOB NO: 321-104

BOREHOLE: MP290B

PROJECT: CECOS-RFI

LOCATION: N 4245.13 E 5763.67

DRILL CONTRACTOR MATHES DRILLING

RIG TYPE: CME 55 HOLLOW STEM AUGER RIG

GWA GEOLOGIST: BOB LUNT

DRILLER: KENT MOORE

DATE START: 10/10/89

DATE FINISH: 10/10/89

GRADE ELEVATION: 897.21

TOTAL DEPTH: 16'

CASING TYPE: N/A

SCREEN TYPE: 316 SS, .010 SLOT

SCREENED INTERVAL: 7' - 12'

GROUND WATER DATA

GROUND WATER DATA				CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	REMARKS	TYPE		SPL SP	
/ /				DIAMETER		2 INCH	
/ /				HAMMER		300#	
/ /				FALL		30 INCH	

BOREHOLE LOG

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
		4		CLAY FILL: dark brown, with some organic material and few sand, soft.	150# HAMMER	
	S-1 VOA	3	10			
		6				
		5				
2						
	S-2 VOA	4	20			
		5				
		10				
		14				
4						
	S-3 VOA	4	23			
		8				
		10				
		14				
6						
	S-4 VOA	6	18			
		8				
		12				
		15				

CLAY FILL: dark brown, with some organic material and few sand, soft.

150# HAMMER

WEATHERED TILL: mostly clay with few sand and silt, moist, firm orange/brown.

Firm - hard.

REMARKS:

MONITORING WELL COMPLETION REPORT

Well No. MP-290B

Job No. 321-104

Project: CECOS - RFI

EL. 899.91

EL. 899.58

EL. 897.21

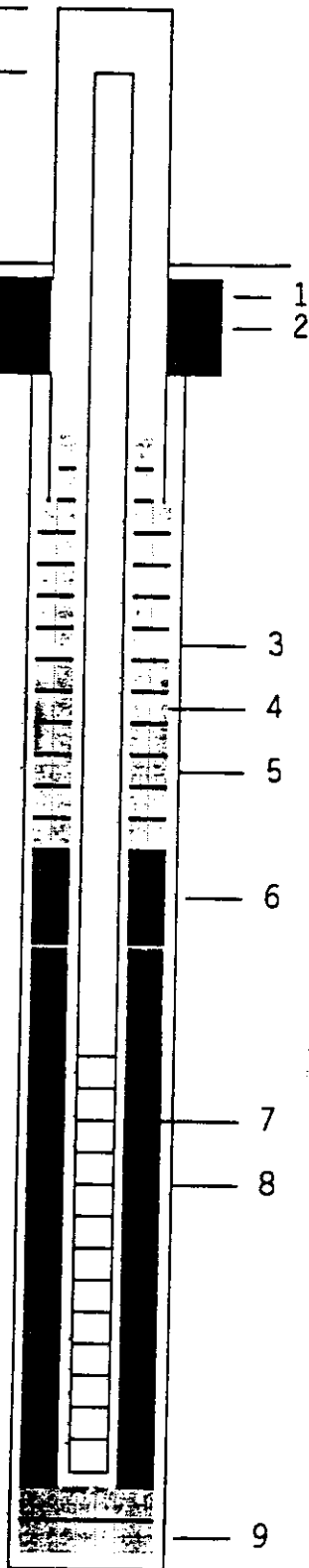
DEPTH 3

DEPTH 3.5

DEPTH 5

DEPTH 12

DEPTH 16



1.) Protective Casing ID 6 inches

2.) Surface Seal Type: Cement

3.) Borehole Diameter 10 inches

4.) Riser Pipe:

a) Type 316 Stainless

b) ID 2 inches

c) Length 7.5 feet

d) Joint Type: Flush Thread

5.) Annular Backfill:

a) Type: Bentonite/Cement Grout

b) Installation: Side Tremie

6.) Annular Seal:

a) Type: Bentonite Pellets

7.) Screen:

a) Type: 316 Stainless

b) ID 2 inches

c) Slot Size .010 inches

d) Length 5 feet

8.) Sand Pack: #4 Sand

9.) Backfill Type: Cuttings

2.5 Ft. Sump Below Screen

GROUND WATER ASSOCIATES
Consulting Hydrogeologists

Page 1 of 5

NO: 321-158		BOREHOLE: MP-294	
PROJECT: OLD DRUM HOLDING AREA		LOCATION: N 5308.23 E 5060.36	
DRILL CONTRACTOR MATHES		RIG TYPE: CME 55	
GWA GEOLOGIST: D LAWTON		DRILLER: KENT MOORE	
DATE START: 12/05/89	DATE FINISH: 12/07/89	GRADE ELEVATION: ^{HSE} 906.19 19.17	TOTAL DEPTH: 55.8
CASING TYPE: N/A		SCREEN TYPE: 316 STAINLESS	SCREENED INTERVAL: 47' - 52'

GROUND WATER DATA				CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	REMARKS	TYPE	NX	5" BAR.	
/ /				DIAMETER	2	4	
/ /				HAMMER		N/A	
/ /				FALL		N/A	

BOREHOLE LOG						
DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
1	S-1		3.5	0 - 4" GRAVEL (FILL) 4" - 1.5' TOPSOIL: grading downward to clayey silt; brown-gray, loose-firm. Moist, with little-some sand.		
2						
3						
4	S-2					
5						
6	S-3					
7			3.2			

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists

Page 2 of 5

NO: 321-158

BOREHOLE: MP-294

PROJECT: OLD DRUM HOLDING AREA

LOCATION:

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
8	S-4			Top weathered upper TILL: gray/brown, moist, soft.		
9						
10				Firm, dry - moist		
11	S-5					
12			4.3	12.2 SAND LAMINAE: fine-very fine, trace iron staining. TILL: as above	Vertical fracture, 12-13' light iron staining.	
13	S-6			SAND: fine-medium TILL: as above	No visible moisture	
14						
15				Clayey SAND: 1 inch, fine- x medium, wet. TILL: with some staining on sub-horizontal surfaces.		
16	S-7					
17			3.5			
18	S-8					
19				Fresh, unweathered. gray/brown.		
20						

REMARKS:

GROUND WATER ASSOCIATES
Consulting Hydrogeologists

Page 3 of 5

NO: 321-158

BOREHOLE: MP-294

PROJECT: OLD DRUM HOLDING AREA

LOCATION:

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
20				TILL: as above		
21	S-9					
22			4.5	Hard/gray, dry - moist.		
23	S-10					
24						
25					Hard drilling	
26	S-11					
27				— SAND: medium-coarse, with some — pebbles. Moist/wet		
28	S-12		4.7	TILL: gray/brown, hard.		
29						
30					Sample no. out of sequence on this interval	
31						
32	S-15				Little water in hole.	

REMARKS:

JOB NO: 321-158

BOREHOLE: MP-294

PROJECT: OLD DRUM HOLDING AREA

LOCATION:

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
32			5'	TILL: as above. gray/brown, hard, moist.		
33	S-16					
34						
35	S-17					
36				Gray, hard	Spoon came out wet	
37	S-13				Samples sitting out prior to jarring.	
38			5'			
39	S-14					
40				Hard, moist.	Little water in hole.	
41						
42			5'			
43	S-17					

REMARKS:

NO: 321-158

BOREHOLE: MP-294

PROJECT: OLD DRUM HOLDING AREA

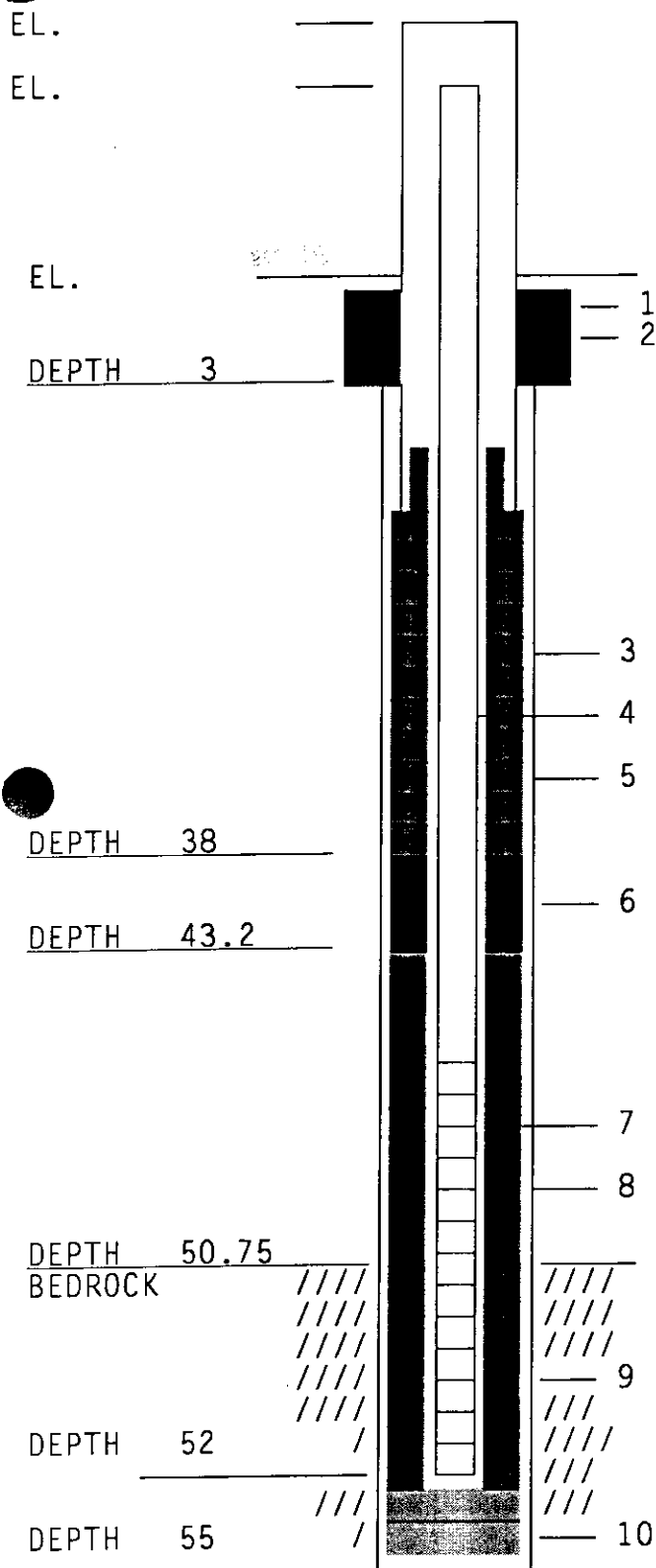
LOCATION:

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
44				TILL: as above		
45	S-18					
46						
47						
48	S-19		5'			
49						
50	S-20			TILL: olive gray. weathered gray shale at 49.9		
51				Refusal on dark gray SHALE. Interbedded SHALE and LIMESTONE: 50.75 - 51.9: thin (.1') beds of limestone with indistinct laminar bedding. Fossiliferous, with shale interbeds	Coring run 1 INT. 50.75 - 55.75 REC 3.2'	
52				51.9 - 55.75 SHALE: gray, soft-firm, with occasional thin limestone bed. No visible fracturing, many core breaks along bedding planes	RQD 16%	
53						
54						
55						
56				CORING TO 55.75		

REMARKS:

MONITORING WELL COMPLETION REPORT

Well No. MP-294
 Job No. 321-158
 Project: Old Drum
Holding Area



- 1.) Protective Casing ID 4 inches
- 2.) Surface Seal Type: Concrete
- 3.) Borehole Diameter 10 inches
- 4.) Riser Pipe:
 - a) Type 316 Stainless
 - b) ID 2 inches
 - c) Length 50 feet
 - d) Joint Type: Flush Thread
- 5.) Annular Backfill:
 - a) Type: Bentonite/Cement
 - b) Installation: Side/Tremie
- 6.) Annular Seal:
 - a) Type: Bentonite Gel
- 7.) Screen:
 - a) Type: 316 Stainless
 - b) ID 2 inches
 - c) Slot Size .010 inches
 - d) Length 5 feet
- 8.) Sand Pack: #4 Sand
- 9.) Reamed Diameter 10
- 10.) Backfill Type: Cuttings/Sand

GROUND WATER ASSOCIATES
Consulting Hydrogeologists

Page 1 of 3

JW NO: 321-158

BOREHOLE: MP-294A

PROJECT: OLD DRUM HOLDING AREA

LOCATION: N 5308.12 E 5066.05

DRILL CONTRACTOR MATHES

RIG TYPE: CME - 55

GWA GEOLOGIST: DAVID LAWTON

DRILLER: KENT MOORE

DATE START: 12/07/89

DATE FINISH: / /

GRADE ELEVATION: ^{EST}903

TOTAL DEPTH: 31.5

CASING TYPE: N/A

SCREEN TYPE: 316 STAINLESS

SCREENED INTERVAL: 23.3-28.3

GROUND WATER DATA

					CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	REMARKS	TYPE			5' BAR.	
/ /				DIAMETER			4 INCH	
/ /				HAMMER			N/A	
/ /				FALL			N/A	

BOREHOLE LOG

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)			
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
10				Augered to 10 ft. without sampling. For lithology see log for MP-294		
11				SAND: To 10.3'. Very fine, with some silt and clay. Moist-wet. 10.3. TILL: weathered brown, with limestone cobble at 11.6'. Iron stained.	Moisture on barrel	
12			4.9			
13						
14						
15				TILL: rusty brown		
16				Cobble		

REMARKS: NO RECOVERY 10-15 FT. PULLED BACK 2 FT. AND REDRILLED.

J NO: 321-158

BOREHOLE: MP-294A

PROJECT: OLD DRUM HOLDING AREA

LOCATION:

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
17			4.5	—Horizontal parting, iron stained cobbles	High angle fracture with iron coating	
18						
19						
20				Brown TILL: unweathered, firm, moist		
21						
22					Vertical fracturing with iron staining.	
23			4.5			
24						
25						
26				—25.8— SAND: poorly sorted, with pebbles and cobbles. Wet.		
27				Sharply sloping base. —26.8— TILL: gray, unweathered, firm/hard, moist.		
28			4.5			
29						

REMARKS:

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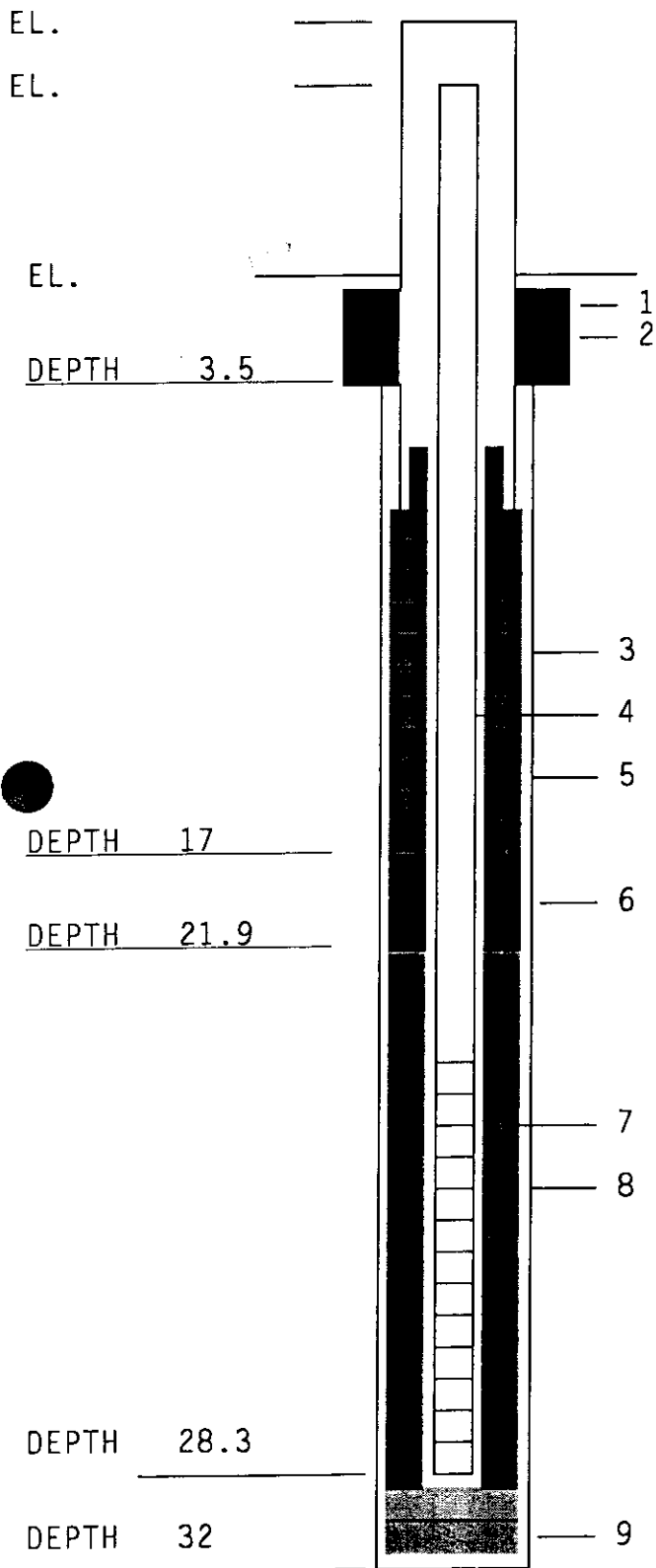
BOREHOLE: MP-294A

LOCATION:

REMARKS:

MONITORING WELL COMPLETION REPORT

Well No. MP-294A
 Job No. 321-158
 Project: Old Drum
Holding Area



- 1.) Protective Casing ID 4 inches
- 2.) Surface Seal Type: Concrete
- 3.) Borehole Diameter 8 inches
- 4.) Riser Pipe:
 - a) Type 316 Stainless
 - b) ID 2 inches
 - c) Length 25 feet
 - d) Joint Type: Flush Thread
- 5.) Annular Backfill:
 - a) Type: Bentonite/Cement
 - b) Installation: Side/Tremie
- 6.) Annular Seal:
 - a) Type: Bentonite Gel
- 7.) Screen:
 - a) Type: 316 Stainless
 - b) ID 2 inches
 - c) Slot Size .010 inches
 - d) Length 5 feet
- 8.) Sand Pack: #4 Sand
- 9.) Backfill Type: #4 Sand

NO: 321-158

BOREHOLE: MP-296

PROJECT: OLD DRUM HOLDING AREA

LOCATION: N 5434.83 E 5002.76

DRILL CONTRACTOR MATHES

RIG TYPE: CME - 55

GWA GEOLOGIST: BRIAN SERSIONS/CECOS

DRILLER: KENT MOORE

DATE START: 01/09/90

DATE FINISH: 01/12/90

GRADE ELEVATION: 22.47 TOTAL DEPTH: 52.5

CASING TYPE: NA

SCREEN TYPE: 316 STAINLESS STEEL

SCREENED INTERVAL: 45-50'

GROUND WATER DATA

GROUND WATER DATA				CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	REMARKS	TYPE		5' BAR.	
/ /				DIAMETER		4 INCH	
/ /				HAMMER		N/A	
/ /				FALL		N/A	

BOREHOLE LOG

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
1	S-1		3.2	0 - .5' TOPSOIL: Brown silty clay, soft, moist. With heavy roots. CLAY: brown and gray, some silt and few/some sand. Firm, moist.		
2				ROOTS and organic material throughout, with slight iron staining around roots.		
3						
4	S-2			Iron staining.		
5						
6	S-3		1.75	TILL: weathered, red-gray/brown. Firm/hard, moist.		
7						
	S-4			SAND: Top 4" coarse, grading down to fine with few/some coarse + few silt. Moist.		

REMARKS:

NO: 321-158

BOREHOLE: MP-296

PROJECT: OLD DRUM HOLDING AREA

LOCATION:

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
8			2.25	COBBLE AT BASE	Vertical fracture to 9.75 heavy iron coating	
9	S-5			TILL: gray/brown, silty with few-trace sand Hard, moist. Horizontal partings, iron stained —— fine sand.		
10				VERY SILTY FINE SAND. Cobble above, little iron staining.		
11				TILL: As above		
12	S-6		2.5	FINE SAND TILL: gray/brown, moist, loosely compacted.		
14	S-7		2.25	Hard, moist.		
15				—— Cobble zone.		
16	S-8		2.8	Cobble in till		
17	S-9			FINE SAND		
18			2.5	TILL: hard, moist. Siltzone: Tr sand, moist		
19				—— COBBLES		
20				SAND: Fine to medium, loose, moist/wet		

REMARKS:

NO: 321-158

BOREHOLE: MP-296

PROJECT: OLD DRUM HOLDING AREA

LOCATION:

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
20				TILL: hard, moist/dry. Slight iron staining at 20.2		
21	S-11		2.7	Very hard.		
22				SAND: very fine, silty		
23	S-12		2.4	TILL: as above. gray/brown moist-dry		
24						
26	S-13					
27				Fractures		
28	S-14		5.2			
29						
30	S-15			Hard - very hard.		
31				Cobble		
32	S-16					

REMARKS:

NO: 321-158

BOREHOLE: MP-296

PROJECT: OLD DRUM HOLDING AREA

LOCATION:

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
32			4.9	TILL: as above		
33						
34	S-17					
35						
36	S-18					
37						
38	S-19		5.1	Dry		
39						
40	S-20					
41						
42	S-21		3.8			
43						
44	S-22			Zone of cobbles and pebbles		

REMARKS:

NO: 321-158

BOREHOLE: MP-296

PROJECT: OLD DRUM HOLDING AREA

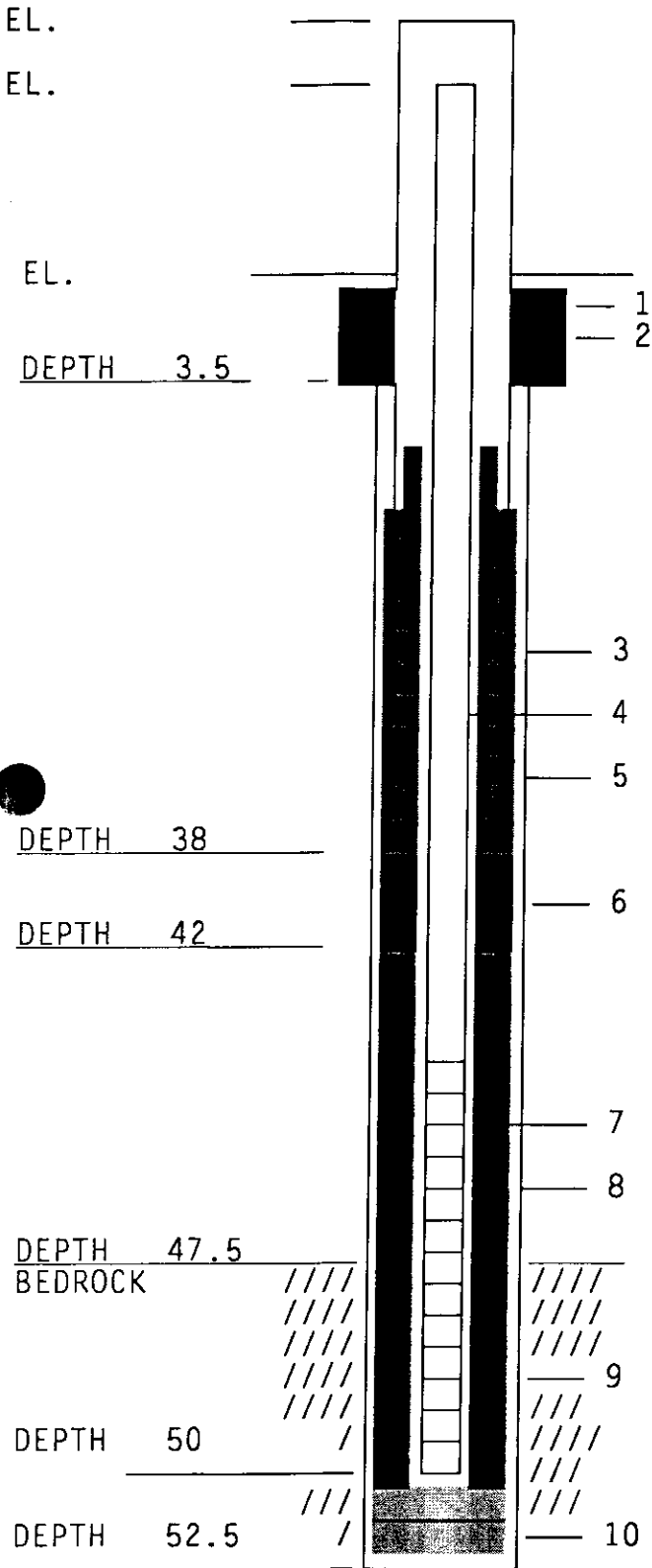
LOCATION:

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
44				TILL: as above		
45				Soft at top.		
46	S-23				Water in hole over lunch hour.	
47			4.5			
48				47.7 Limestone (boulder) SAND laminae, fine grained weathered gray SHALE: thinly laminated, dry. Cobble		
50				Dry - moist, with thin beds of fossili- ferrous limestone.		
51			2.9	Massive SHALE: gray, dry, with interbedded limestone (thin)	BTI 48.2'	
52				SAMPLING TO 52.6		

REMARKS:

MONITORING WELL COMPLETION REPORT

Well No. MP-296
 Job No. 321-158
 Project: Old Drum
Holding Area



- 1.) Protective Casing ID 6 inches
- 2.) Surface Seal Type: Concrete
- 3.) Borehole Diameter 9 inches
- 4.) Riser Pipe:
 - a) Type 316 Stainless
 - b) ID 2 inches
 - c) Length 47.5 feet
 - d) Joint Type: Flush Thread
- 5.) Annular Backfill:
 - a) Type: Bentonite/Grout
 - b) Installation: Side Tremie
- 6.) Annular Seal:
 - a) Type: Bentonite Gel
- 7.) Screen:
 - a) Type: 316 Stainless
 - b) ID 2 inches
 - c) Slot Size .010 inches
 - d) Length 5 feet
- 8.) Sand Pack: #4 Sand
- 9.) Reamed Diameter 9 inches
with augers
- 10.) Backfill Type: Cuttings/Sand

NO: 321-158

BOREHOLE: MP-296A

PROJECT: OLD DRUM HOLDING AREA

LOCATION: N 5429.75 E 5001.62

DRILL CONTRACTOR MATHES

RIG TYPE: CME-55

GWA GEOLOGIST: CECOS/ BRIAN SERISION

DRILLER: KENT MOORE

DATE START: 01/03/90

DATE FINISH: 01/08/90

GRADE ELEVATION:

TOTAL DEPTH: 24.75

CASING TYPE: N/A

SCREEN TYPE: 316 STAINLESS STEEL

SCREENED INTERVAL: 18-23'

GROUND WATER DATA

GROUND WATER DATA				CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	REMARKS	TYPE		5FT. BAR	
/ /				DIAMETER		4 INCH	
/ /				HAMMER		N/A	
/ /				FALL		N/A	

BOREHOLE LOG

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
1	S-1		4.75	TOPSOIL: brown, wet, soft. Very silty clay with rootlets.		
2				.8 FT. — CLAY: mottled reddish brown and gray, few silt with trace sand. Soft, moist, with rootlets		
3	S-2			firm, moist, grading downward to few sand.		
4				iron staining, 3.5 Ft. downward.		
5	S-3			Red heavily iron stained clay; silty.		
6				tr pebbles		
7	S-4		2.5	with some sand. hard, moist.	Grain size analysis	
				7.0 Ft. — WEATHERED TILL: silty clay with few sand, some gravel and pebbles. poorly sorted.	Heavily iron stained	

REMARKS:

NO: 321-158

BOREHOLE: MP-296A

PROJECT: OLD DRUM HOLDING AREA

LOCATION:

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
8				WEATHERED TILL: AS ABOVE. Hard, moist.		
9						
10				Red/brown silty laminae.		
11	S-5					
12			2			
13						
14						
15					Resume drilling 01/08/90. Water in hole.	
16						
17	S-6		3.25	<p>———— Fine SAND laminae.</p> <p>———— SAND: medium - fine, trace cobbles. moist.</p> <p>TILL: AS ABOVE.</p>		
18				17.9 fT. SAND: medium - fine grained, trace - few coarse grained. Wet. Shale fragments at top, trace cobbles at base. Light brown.		
19						
20					Water in hole.	

REMARKS:

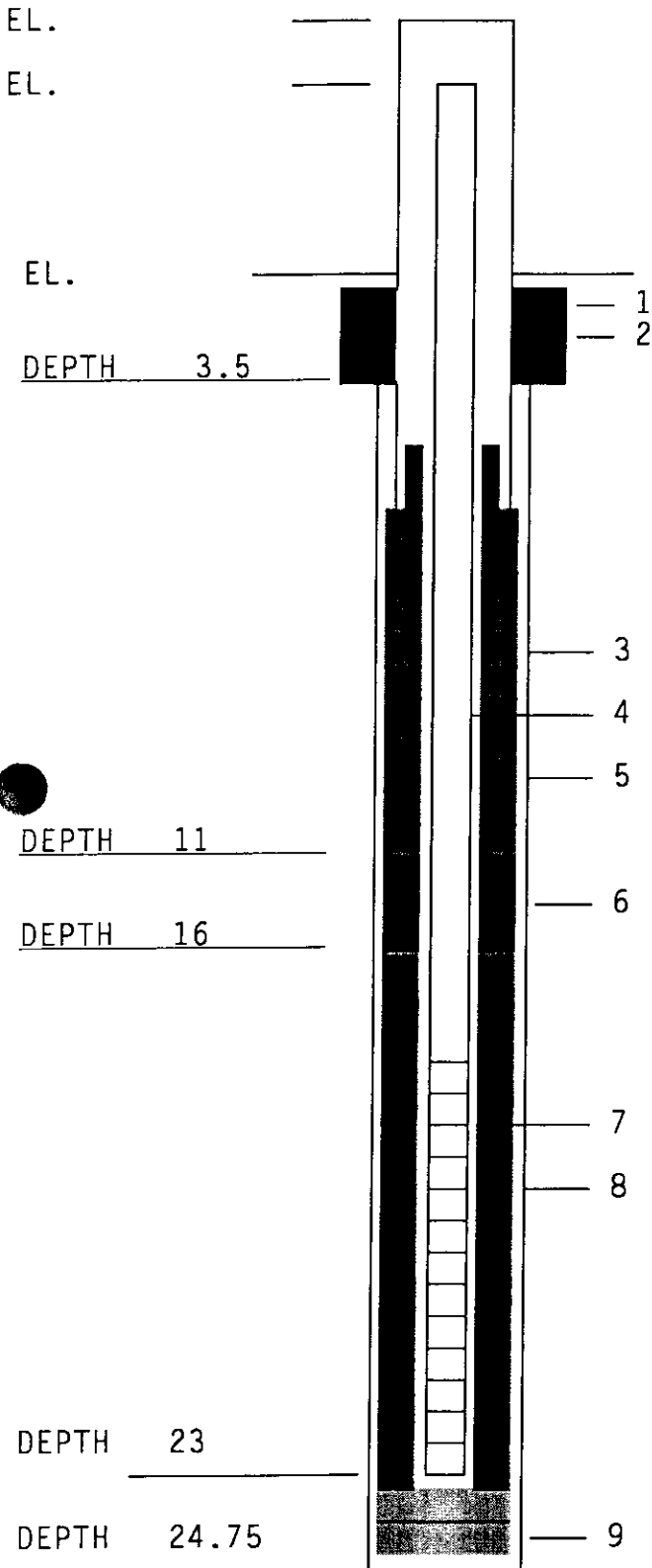
BOREHOLE: MP-296A

LOCATION:

REMARKS:

MONITORING WELL COMPLETION REPORT

Well No. MP-296A
 Job No. 321-158
 Project: Old Drum
Holding Area



- 1.) Protective Casing ID 6 inches
- 2.) Surface Seal Type: Concrete
- 3.) Borehole Diameter 9 inches
- 4.) Riser Pipe:
 - a) Type 316 Stainless
 - b) ID 2 inches
 - c) Length 20 feet
 - d) Joint Type: Flush Thread
- 5.) Annular Backfill:
 - a) Type: Bentonite/Grout
 - b) Installation: Side/Tremie
- 6.) Annular Seal:
 - a) Type: Bentonite Gel
- 7.) Screen:
 - a) Type: 316 Stainless
 - b) ID 2 inches
 - c) Slot Size .010 inches
 - d) Length 5 feet
- 8.) Sand Pack: #4 Sand
- 9.) Backfill Type: Cuttings/Sand

GROUND WATER ASSOCIATES
Consulting Hydrogeologists

Page 1 of 2

JOB NO: 321-104

BOREHOLE: MP-299B

SUBJECT: RFI ADDITIONAL WORK

LOCATION: N 6072.20 E 5700.12

DRILL CONTRACTOR MATHES

RIG TYPE: CME 75 HOLLOW STEM AUGER

GWA GEOLOGIST: DAVID LAWTON

DRILLER: DARYL WRIGHT

DATE START: 01/08/91

DATE FINISH: 01/08/91

GRADE ELEVATION: 909.1

TOTAL DEPTH: 25 FT.

CASING TYPE: N/A

SCREEN TYPE: .010 SLOT STAINLESS

SCREENED INTERVAL: 20-22.5'

GROUND WATER DATA

GROUND WATER DATA				CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	REMARKS	TYPE		5' CONT	
/ /				DIAMETER		4.25" ID	
/ /				HAMMER		N/A	
/ /				FALL		N/A	

BOREHOLE LOG

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
0	S-1			0-.7 Ft. TOPSOIL: Brown silty clay, moist. Roots.		
2	S-2		5/4.5	.7-1.5 Ft. CLAY: Brown, silty, moist.		
4	S-3			1.5-5 Ft. CLAY: Brown (rusty) - gray mottling, with some silt.	No visible fractures	
				Black carbonaceous nodules in clay.		
6	S-4		5/5	Heavy iron staining in clay, moist.		
8	S-5			TILL: Brown, firm - hard, moist. Some rock fragments throughout.		
10	S-6					
12	S-7		5/5	Horizontal, iron stained fractures spaced approximately 2 Ft. apart, in till.		
14	S-8					

REMARKS: Hnu and LEL at background during drilling.

GROUND WATER ASSOCIATES
Consulting Hydrogeologists

Page 2 of 2

NO: 321-104

BOREHOLE: MP-299B

PROJECT: RFI ADDITIONAL WORK

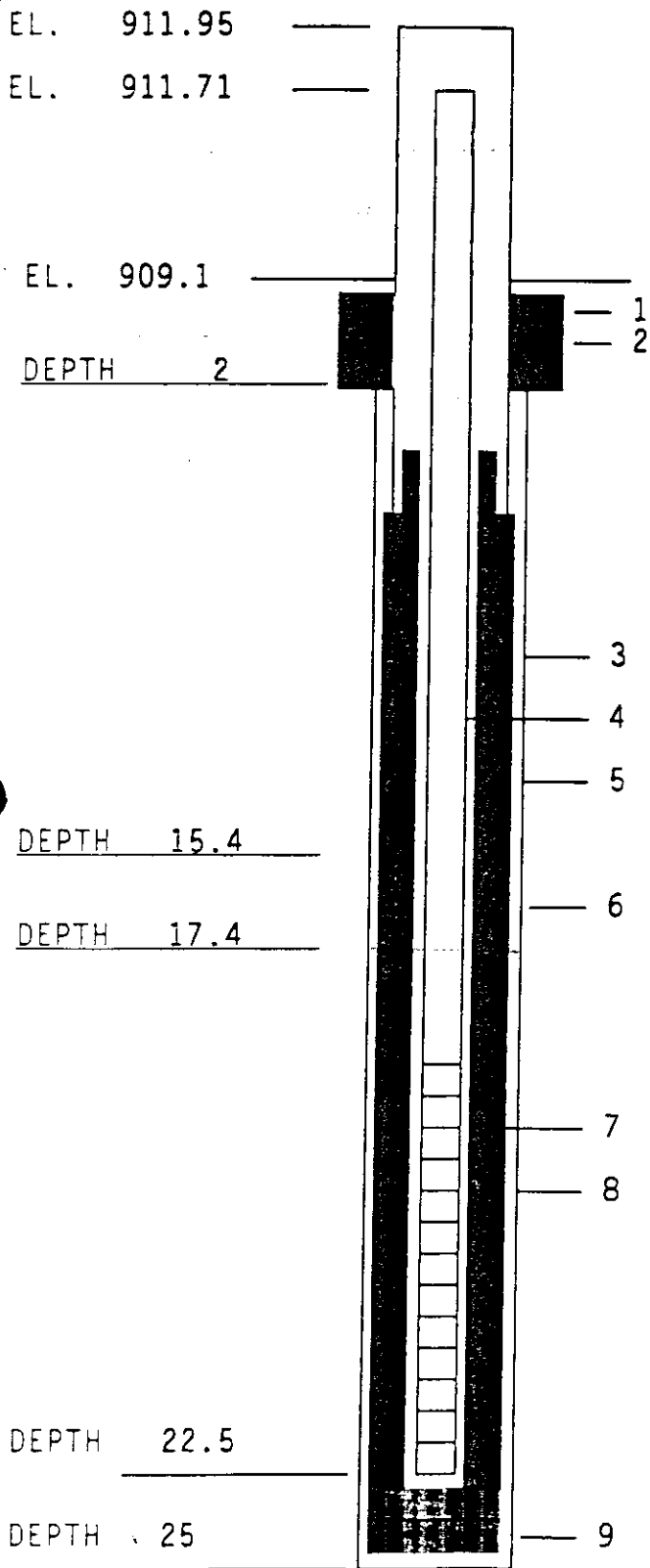
LOCATION: CECOS ABER ROAD FACILITY

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
16	S-9		5/5	TILL: as above.		
18	S-10			== Fine sand laminae at 19 Ft.		
20	S-11					
22	S-12		5/5	<div> <div>21 Ft.</div> <div>SAND: Med - coarse, wet.</div> <div>21.4 Ft.</div> </div> Till: gray/brown, hard, moist.	Sample sent for grain size analysis	
24	S-13			_____ TO 25 FT. _____	Sample from 21.4-21.7' sent for permeability test.	

REMARKS:

MONITORING WELL COMPLETION REPORT

Well No. MP-299B
 Job No. 321-104
 Project: RFI ADDENDUM



- 1.) Protective Casing ID 6 inches
- 2.) Surface Seal Type: Concrete
- 3.) Borehole Diameter 8 inches
- 4.) Riser Pipe:
 - a) Type 316 STAINLESS
 - b) ID 2 inches
 - c) Length 22.5 feet
 - d) Joint Type: FLUSH THREAD + "O"
- 5.) Annular Backfill:
 - a) Type: BENT./CEMENT GROUT
 - b) Installation: TREMIE
- 6.) Annular Seal:
 - a) Type: BENTONITE PELLETS
- 7.) Screen:
 - a) Type: 316 STAINLESS STEEL
 - b) ID 2 inches
 - c) Slot Size .010 inches
 - d) Length 2.5 feet
- 8.) Sand Pack: #7 Silica
- 9.) Backfill Type: #7 Silica and
Natural Material

* Well has a 2.5 foot sump.

Page 1 of 2

BOREHOLE: MP-300A

LOCATION: N 6106.39 E 5262.67

RIG TYPE: CME 75 HOLLOW STEM AUGER

DRILLER: DARYL WRIGHT

TOTAL DEPTH: 23 FT.

SCREENED INTERVAL: 23-18 FT.

CASING

CORE

SAMPLER

TUBE

TIME

DEPTH

REMARKS

TYPE

5' CONT

/ /

DIAMETER

4.25" ID

/ /

HAMMER

N/A

/ /

FALL

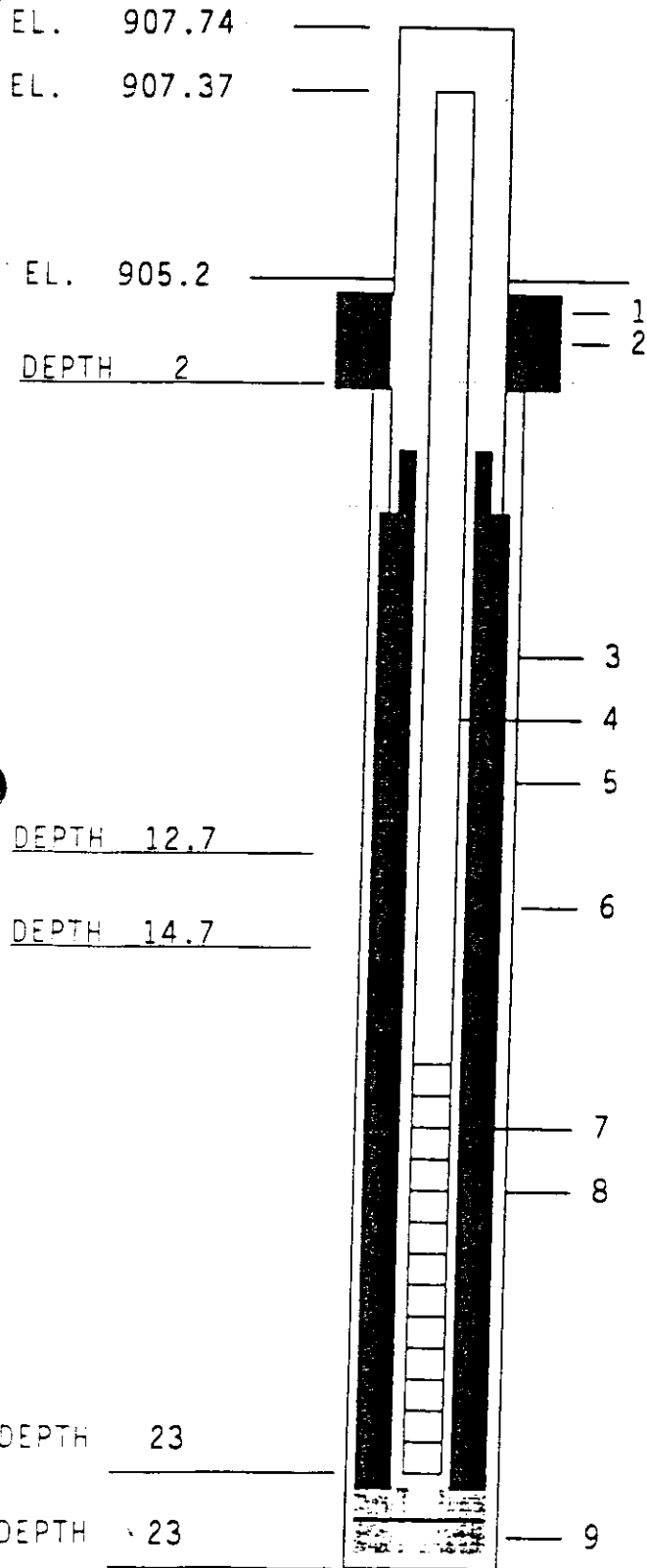
N/A

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG	
				LITHOLOGIC DESCRIPTION	REMARKS
	S-1			TOPSOIL: 0-1'. CLAY: yellow/brown, soft, moist Roots.	
2	S-2		5/3.7	1-1.8' CLAY: Silty, gray, soft, moist. Roots; wood fragments. 1.8-5' CLAY: Yellow brown with gray mottling. Firm, moist, occasional root.	
4	S-3			Silty in part, trace of sand.	
6	S-4		5/4.0		
8	S-5				
10	S-6			8.4' — TILL: hard, stiff, brown. Moist. Trace of silt sand, gravel, rock fragments within.	
12	S-7		5/5.0		
14	S-8			Color change to gray brown at 13 ft. == Fine sand laminae at 13.8 ft.	
					No water in hole.

REMARKS: Hnu and LEL on background while drilling.

MONITORING WELL COMPLETION REPORT

Well No. MP-300A
 Job No. 321-104
 Project: RFI ADDENDUM



- 1.) Protective Casing ID 6 inches
- 2.) Surface Seal Type: Concrete
- 3.) Borehole Diameter 8 inches
- 4.) Riser Pipe:
 - a) Type 316 STAINLESS
 - b) ID 2 inches
 - c) Length 20 feet
 - d) Joint Type: FLUSH THREAD + "O"
- 5.) Annular Backfill:
 - a) Type: BENT./CEMENT GROUT
 - b) Installation: TREMIE
- 6.) Annular Seal:
 - a) Type: BENTONITE PELLETS
- 7.) Screen:
 - a) Type: 316 STAINLESS STEEL
 - b) ID 2 inches
 - c) Slot Size .010 inches
 - d) Length 5 feet
- 8.) Sand Pack: #7 Silica and Natural
Formation Sand
- 9.) Backfill Type: -

GROUND WATER ASSOCIATES
Consulting Hydrogeologists

Page 1 of 2

JOB NO: 321-104

BOREHOLE: MP-301B

SUBJECT: RFI ADDITIONAL WORK

LOCATION: N 6157.14 E 5452.74

DRILL CONTRACTOR MATHES

RIG TYPE: CME 75 HOLLOW STEM AUGER

GWA GEOLOGIST: JIM FERGUSON/RIZZO

DRILLER: BARRY SOWERS

DATE START: 01/09/91

DATE FINISH: 01/10/91

GRADE ELEVATION: 905.6

TOTAL DEPTH: 20 FT.

CASING TYPE: N/A

SCREEN TYPE: .010 SLOT STAINLESS

SCREENED INTERVAL: 11-16 FT.

GROUND WATER DATA

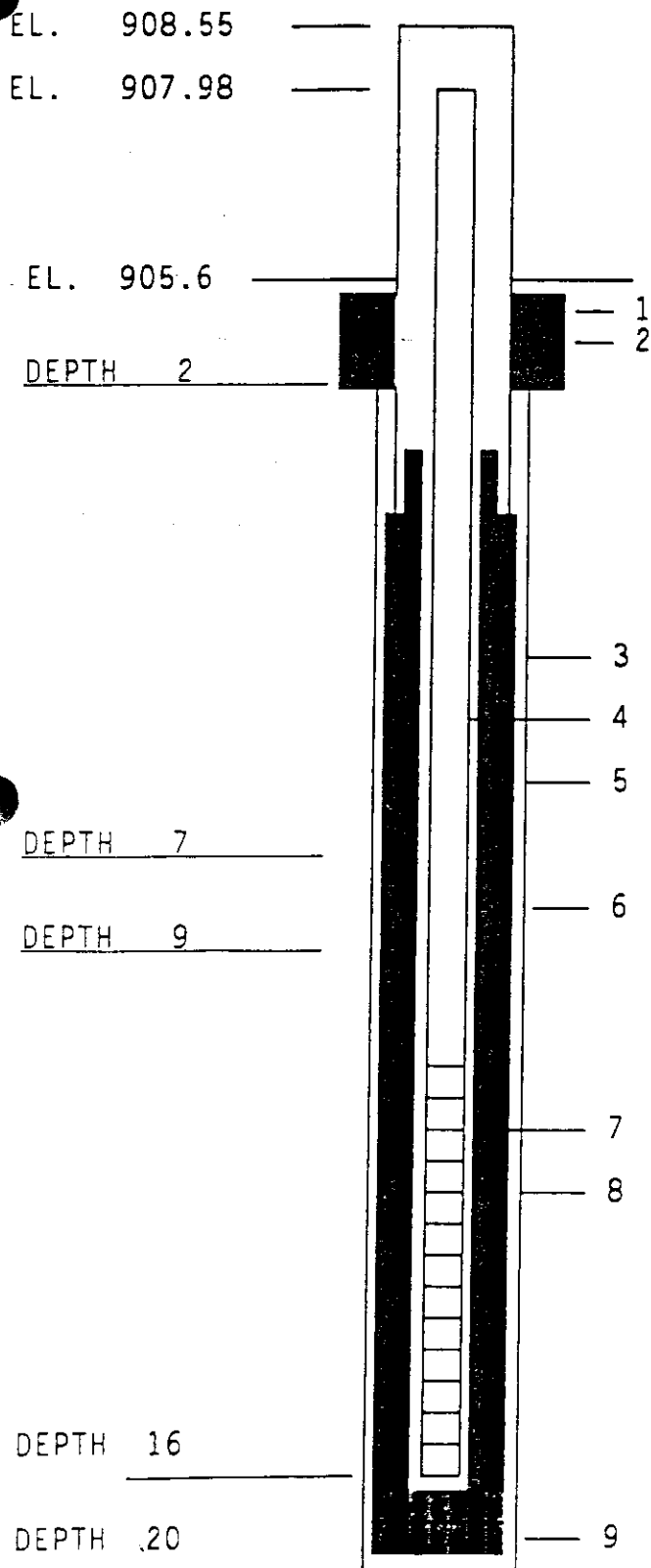
DATE	TIME	DEPTH	REMARKS	TYPE	CASING	CORE	SAMPLER	TUBE
/ /							5' CONT	
/ /				DIAMETER			4.25" ID	
/ /				HAMMER			N/A	
/ /				FALL			N/A	

DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	BOREHOLE LOG		
				LITHOLOGIC DESCRIPTION	REMARKS	LOG
	S-1			0-1' TOPSOIL: Brown silty clay, trace of gravel. With some roots. Damp.		
2	S-2		5/5	1-5' CLAY: Silty, mottled brown/gray, firm, moist. Trace gravel. Some iron staining.		
4	S-3					
6	S-4		5/4.5			
8	S-5			8.0 Ft. ——— TILL: Brown, firm - hard, moist.		
10	S-6			10.0 Ft. ——— 10-13' SILTY SAND WITH CLAY: Brown/gray, with trace gravel, wet.		
12	S-7		5/5			
14	S-8			13.0 Ft. ——— 13-15' TILL: Brown/gray, hard, with vertical fracturing. Damp.		
				15 Ft. ——— 15-16' FINE SILTY SAND WITH CLAY: Trace gravel Occasional clean sand laminae.		

REMARKS: Hnu and LEL at background while drilling.

MONITORING WELL COMPLETION REPORT

Well No. MP-301B
 Job No. 321-104
 Project: RFI ADDENDUM



- 1.) Protective Casing ID 6 inches
- 2.) Surface Seal Type: Concrete
- 3.) Borehole Diameter 8 inches
- 4.) Riser Pipe:
 - a) Type 316 STAINLESS
 - b) ID 2 inches
 - c) Length 13.5 feet
 - d) Joint Type: FLUSH THREAD + "O"
- 5.) Annular Backfill:
 - a) Type: BENT./CEMENT GROUT
 - b) Installation: TREMIE
- 6.) Annular Seal:
 - a) Type: BENTONITE PELLETS
- 7.) Screen:
 - a) Type: 316 STAINLESS STEEL
 - b) ID 2 inches
 - c) Slot Size .010 inches
 - d) Length 5 feet
- 8.) Sand Pack: #7 Silica Sand
- 9.) Backfill Type: #7 Silica Sand

JOB NO: 321-104

BOREHOLE: MP-3038

PROJECT: RFI ADDITIONAL WORK

LOCATION: N 6167.36 E 5349.39

DRILL CONTRACTOR MATHES

RIG TYPE: CME 75 HOLLOW STEM AUGER

GWA GEOLOGIST: DAVID LAWTON

DRILLER: BARRY SOWERS

DATE START: 01/16/91

DATE FINISH: 01/16/91

GRADE ELEVATION: 904.4

TOTAL DEPTH: 15 FT.

CASING TYPE: N/A

SCREEN TYPE: .010 SLOT STAINLESS

SCREENED INTERVAL: 8.5-11 FT

GROUND WATER DATA

GROUND WATER DATA				CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	REMARKS	TYPE		5' CONT	
/ /				DIAMETER		4.25" ID	
/ /				HAMMER		N/A	
/ /				FALL		N/A	

BOREHOLE LOG

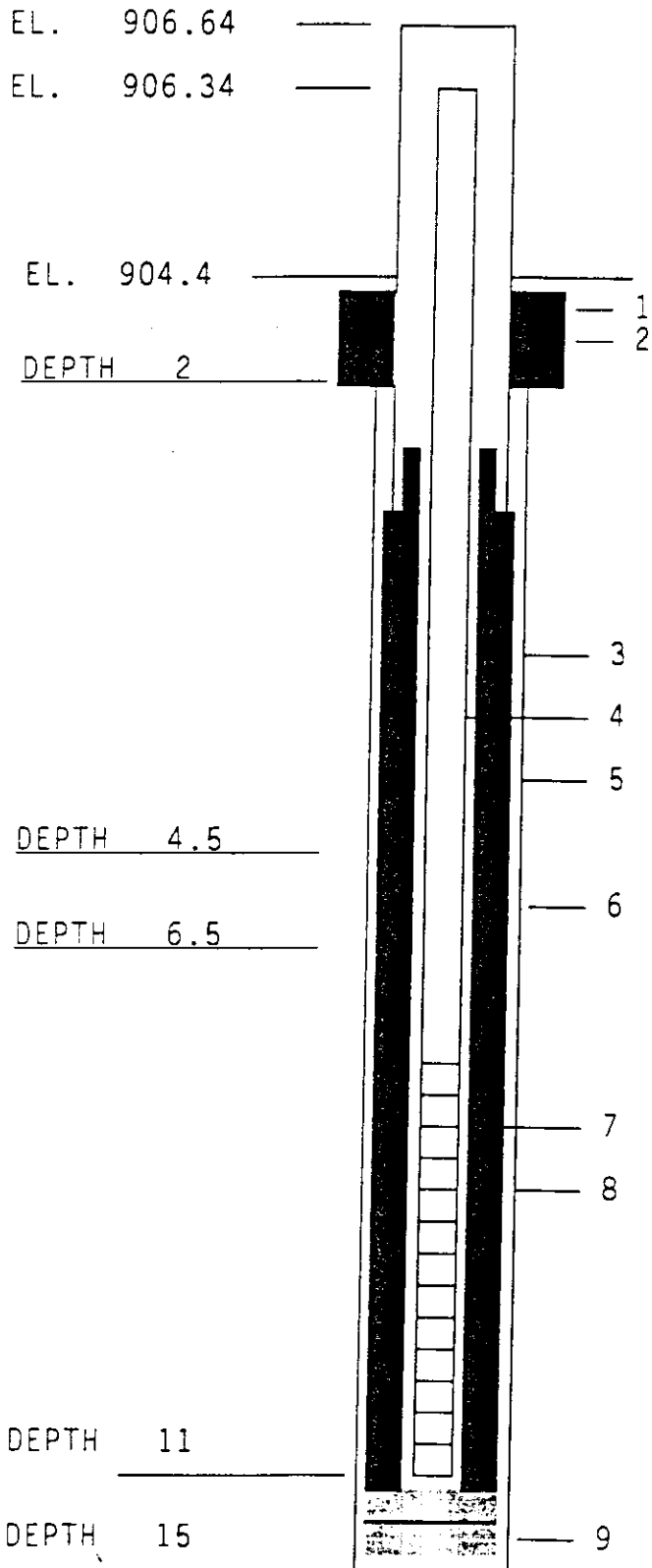
DEPTH	SAMPLE NUMBER	BLOW COUNTS	RECOV. (in.)	LITHOLOGIC DESCRIPTION	REMARKS	LOG
	S-1			0-.5 Ft. TOPSOIL: Dark brown clay, moist.		
2	S-2		5/2.2	.5-7.4 Ft. CLAY: Tan/brown, firm, plastic. Moist.		
4	S-3			Silty.		
6	S-4		5/5	Black carbonaceous layers in clay.		
8	S-5			7.4 Ft. TILL: Brown, with some iron staining, firm-hard, moist.		
10	S-6			10.0 Ft. SAND: Medium - coarse, wet. Trace of gravel.		
12	S-7		5/5	10.7 Ft. TILL: Brown/gray, firm-hard, moist		
14	S-8			Occasional iron stained horizontal fractures.		
				TD 15 FT.		

Sample sent
for grain
size analysis

REMARKS: Hnu and LEL read background while drilling.

MONITORING WELL COMPLETION REPORT

Well No. MP-3038
 Job No. 321-104
 Project: RFI ADDENDUM



- 1.) Protective Casing ID 6 inches
- 2.) Surface Seal Type: Concrete
- 3.) Borehole Diameter 8 inches
- 4.) Riser Pipe:
 - a) Type 316 STAINLESS
 - b) ID 2 inches
 - c) Length 10 feet
 - d) Joint Type: FLUSH THREAD + "O"
- 5.) Annular Backfill:
 - a) Type: BENT./CEMENT GROUT
 - b) Installation: TREMIE
- 6.) Annular Seal:
 - a) Type: BENTONITE PELLETS
- 7.) Screen:
 - a) Type: 316 STAINLESS STEEL
 - b) ID 2 inches
 - c) Slot Size .010 inches
 - d) Length 2.5 feet
- 8.) Sand Pack: #7 Silica Sand
- 9.) Backfill Type: #7 Silica Sand
Well has 2.5 Ft. sump.

LOCATION MAP			PARSONS ENGINEERING SCIENCE LOG		PAGE 1 OF 3		
ELEVATION 906.5			BORING NUMBER MP-304		LOCATION CECOS		
			DATE 9-14-97		WEATHER 78°, PARTLY CLOUDY		
			LOCATED BY ERIC MYSONA		DRILLED BY BOART LONGYEAR		
			DRILLING METHOD 8.25" HSA TO 29'		SAMPLING METHOD 2" SPLIT SPOON		
			GRAVEL PACK #5 SILICA SAND		SEAL BENTONITE		
CASING TYPE TYPE 304 STAINLESS STEEL					DIAMETER 2"	LENGTH 51'	
SCREEN TYPE STAINLESS STEEL SLOT 0.010"					DIAMETER 2"	LENGTH 5'	
					HOLE DIA. 6"	TOTAL DEPTH 56'	
SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH (FT)	SAMPLE RECOVERY	PENETRATION RESISTANCE	DESCRIPTION/REMARKS (COLOR, MOISTURE, PLASTICITY, SORTING, SOIL TYPE.)	LITHO. PROFILE	WELL COMPLETION FLUSH MOUNT PROTECTIVE COVER
		0			3" OF ASPHALT		
		1			DRY GRAVEL PAVING SUB-BASE		
		2			SLIGHTLY MOIST BROWN & GRAY SILTY CLAY		
		3					
		4					
		5		2			
		6		3			
		7		5			
		8		4			
		9		1	SLIGHTLY MOIST, PLASTIC, BROWN SILTY CLAY		
		10		2	WITH 10% GRAVEL		
		11		3			
		12		3			
		13		2	1" OF MOIST GRAY CLAYEY SAND		
		14		1			
		15		NA			
		16		NA			
		17		NA			
		18		6	DRY, BRITTLE GRAY SILTY CLAY WITH 15% GRAVEL (TILL)		
		19		10			
		20		11			
		21		9			
		22		12			
		23		11	1" MOIST BROWN & GRAY CLAYEY SAND		
		24		8	DRY, BRITTLE, GRAY SILTY CLAY WITH 20% GRAVEL (TILL)		
		25		12			
		26		NA			
		27		NA			
		28		16			
		29		18			
		30		25			
		31		50/2"			

FEBRUARY-10-98 BTM/H 726691 MP304.DWG

SAND	CASING	BENTONITE	INITIAL WATER LEVEL
BACKFILL	SCREEN	CEMENT	STATIC WATER LEVEL

CECOS 087289

LOCATION MAP			PARSONS ENGINEERING SCIENCE LOG		PAGE 2 OF 3	
BORING NUMBER MP-304			LOCATION CECOS			
DATE 9-14-97			WEATHER 78°, PARTLY CLOUDY			
LOCATED BY ERIC MYSONA			DRILLED BY BOART LONGYEAR			
DRILLING METHOD ROTOSONIC FROM 29' TO 55'			SAMPLING METHOD 4" CORE BARREL			
GRAVEL PACK #5 SILICA SAND			SEAL BENTONITE			
ELEVATION 906.5						
CASING TYPE TYPE 304 STAINLESS STEEL			DIAMETER 2"		LENGTH 51'	
SCREEN TYPE STAINLESS STEEL SLOT 0.010"			DIAMETER 2"		LENGTH 5'	
					HOLE DIA. 6"	
					TOTAL DEPTH 56'	
SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH (FT)	SAMPLE RECOVERY	PENETRATION RESISTANCE	DESCRIPTION/REMARKS (COLOR, MOISTURE, PLASTICITY, SORTING, SOIL TYPE.)	LITHO. PROFILE
		20				
		21		26	SLIGHTLY MOIST GRAY SILTY CLAY WITH 10% GRAVEL (TILL)	
		22		29	MOIST BROWN & GRAY SAND & GRAVEL WITH 20% SILT	
		23		30		
		24		34	DRY, BRITTLE GRAY SILTY CLAY WITH 10% GRAVEL (TILL)	
		25		25		
		26		31		
		27		37		
		28		34		
		29		12	DRY, BRITTLE GRAY SILTY CLAY WITH 15% GRAVEL (TILL)	
		30		18		
		31		20		
		32		41		
		33		17		
		34		12		
		35		23		
		36		41		
		37		NA		
		38		NA		
		39		NA		
		40		NA		
		41				

FEBRUARY-10-98 BTMH 726681MP304B.DWG

SAND

BACKFILL

CASING

SCREEN

BENTONITE

CEMENT

INITIAL WATER LEVEL

STATIC WATER LEVEL

CECOS CEC087290

LOCATION MAP			PARSONS ENGINEERING SCIENCE LOG		PAGE 1 OF 2		
BORING NUMBER MP-304A			LOCATION CECOS				
DATE 9-17-97			WEATHER 69°. CLOUDY				
LOCATED BY ERIC MYSONA			DRILLED BY BOART LONGYEAR				
DRILLING METHOD 8.25" HSA TO 17.5'			SAMPLING METHOD 2" SPLIT SPOON				
ELEVATION 906.5			GRAVEL SEAL BENTONITE				
CASING TYPE TYPE 304 STAINLESS STEEL			DIAMETER 2"		LENGTH 20'		
SCREEN TYPE STAINLESS STEEL SLOT			0.010" DIAMETER 2"		LENGTH 5'		
					HOLE DIA. 13", 6"		
					TOTAL DEPTH 30'		
SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH (FT)	SAMPLE RECOVERY	PENETRATION RESISTANCE	DESCRIPTION/REMARKS (COLOR, MOISTURE, PLASTICITY, SORTING, SOIL TYPE.)	LITHO. PROFILE	WELL COMPLETION FLUSH MOUNT PROTECTIVE COVER
		0		300lb	HAMMER		
		1			2" OF ASPHALT		
		2			DRY GRAVEL PAVING SUB-BASE		
		3			SLIGHTLY MOIST, PLASTIC BROWN & GRAY SILTY CLAY WITH 5% GRAVEL		
		4					
		5					
		6					
		7					
		8					
		9					
		10		6			
		11		8			
		12		7			
		13		11	1" OF WET GRAY CLAYEY SAND		
		14		12	DRY, FRIABLE, GRAY SILTY CLAY WITH 15% GRAVEL		
		15		10			
		16		16			
		17		12			
		18		13			
		19		12			
		20		16			
		21		15			
					MOIST BROWN SAND WITH 20% SILT		
					DRY, GRAY SILTY CLAY WITH 15% GRAVEL		

FEBRUARY-9-98/BTMH 726691MP304A.DWG

SAND

BACKFILL

CASING

SCREEN

BENTONITE

CEMENT

INITIAL WATER LEVEL

STATIC WATER LEVEL

CECOS

087292

LOCATION MAP			PARSONS ENGINEERING SCIENCE LOG				PAGE 2 OF 2	
BORING NUMBER MP-304A			LOCATION CECOS					
DATE 9-17-97			WEATHER 69°, CLOUDY					
LOCATED BY ERIC MYSONA			DRILLED BY BOART LONGYEAR					
DRILLING METHOD ROTASONIC FROM 17.5' TO 25'			SAMPLING METHOD 2" SPLIT SPOON					
GRAVEL PACK #5 SILICA SAND			SEAL BENTONITE					
ELEVATION 906.5								
CASING TYPE TYPE 304 STAINLESS STEEL			DIAMETER 2"		LENGTH 20'		HOLE DIA. 13", 6"	
SCREEN TYPE STAINLESS STEEL SLOT			0.010" DIAMETER 2"		LENGTH 5'		TOTAL DEPTH 30'	
SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH (FT)	SAMPLE RECOVERY	PENETRATION RESISTANCE	DESCRIPTION/REMARKS (COLOR, MOISTURE, PLASTICITY, SORTING, SOIL TYPE)	LITHO. PROFILE	WELL COMPLETION	
		20		300lb	DRY, FRIABLE, GRAY SILTY CLAY WITH 15% GRAVEL		-	
		21						-
		22						-
		23						-
		24					WET GRAY & BROWN CLAYEY SAND WITH 20% GRAVEL	-
		25						-
		26						-
		27					DRY, FRIABLE GRAY SILTY CLAY WITH 15% GRAVEL	-
		28						-
		29						-
		30			BORING ENDS AT 30'			
		31						
		32						
		33						
		34						
		35						
		36						
		37						
		38						
		39						
		40						
		41						

FEBRUARY-9-98\BTMH 726691MP304A2.DWG

SAND
 BACKFILL

CASING
 SCREEN

BENTONITE
 CEMENT

▽

 INITIAL WATER LEVEL

▽

 STATIC WATER LEVEL

CECOS CECOS 087293

LOCATION MAP		PARSONS ENGINEERING SCIENCE LOG				PAGE 1 OF 3	
ELEVATION 905		BORING NUMBER MP-305		LOCATION CECOS			
		DATE 9-14-97		WEATHER 78°, PARTLY CLOUDY			
		LOCATED BY ERIC MYSONA		DRILLED BY BOART LONGYEAR			
		DRILLING METHOD 8.25" HSA TO 21'		SAMPLING METHOD 2" SPLITSPOON			
		GRAVEL PACK #5 SILICA SAND		SEAL BENTONITE			
CASING TYPE TYPE 304 STAINLESS STEEL		DIAMETER 2"		LENGTH 48'		HOLE DIA. 6"	
SCREEN TYPE STAINLESS STEEL SLOT		0.010" DIAMETER 2"		LENGTH 5'		TOTAL DEPTH 53'	
SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH (FT)	SAMPLE RECOVERY	PENETRATION RESISTANCE	(DESCRIPTION/REMARKS COLOR, MOISTURE, PLASTICITY, SORTING, SOIL TYPE.)	LITHO. PROFILE	WELL COMPLETION FLUSH MOUNT PROTECTIVE COVER
		0		300lb	HAMMER		 INSTALLED 8" STEEL CASING TO 20'
		1			2" OF ASPHALT		
		2			DRY GRAVEL PAVING SUB-BASE		
		3					
		4			SLIGHTLY MOIST, PLASTIC, BROWN & GRAY SILTY CLAY, 5% GRAVEL		
		5		2			
		6		2			
		7		3			
		8		3			
		9		2			
		10		5			
		11		4	DRY, FRIABLE BROWN & GRAY SILTY CLAY WITH 10% GRAVEL (TILL)		
		12		7			
		13		9			
		14		12			
		15		19			
		16		16			
		17		21			
		18		15	DRY, FRIABLE GRAY SILTY CLAY WITH 15% GRAVEL (TILL)		
		19		17			
		20		19			
		21		20			
		22		14			
		23		15			
		24		50/1"			
		25		19			
		26		50/1"			
		27		21			
		28		50/2"			
		29					
		30					

FEBRUARY-9-97/8TMH 725691MP305-1.DWG

SAND	CASING	BENTONITE	INITIAL WATER LEVEL
BACKFILL	SCREEN	CEMENT	STATIC WATER LEVEL

CECOS 087294

LOCATION MAP		PARSONS ENGINEERING SCIENCE LOG				PAGE 2 OF 3	
ELEVATION 905		BORING NUMBER MP-305		LOCATION CECOS			
		DATE 9-14-97		WEATHER 78°, PARTLY CLOUDY			
		LOCATED BY ERIC MYSONA		DRILLED BY BOART LONGYEAR			
		DRILLING METHOD ROTASONIC FROM 21 TO 53'		SAMPLING METHOD 4" CORE BARREL			
		GRAVEL PACK #5 SILICA SAND		SEAL BENTONITE			
CASING TYPE TYPE 304 STAINLESS STEEL		DIAMETER 2"		LENGTH 48'		HOLE DIA. 6"	
SCREEN TYPE STAINLESS STEEL SLOT		0.010"		DIAMETER 2"		LENGTH 5'	
						TOTAL DEPTH 53'	
SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH (FT)	SAMPLE RECOVERY	PENETRATION RESISTANCE	(DESCRIPTION/REMARKS COLOR, MOISTURE, PLASTICITY, SORTING, SOIL TYPE.)	LITHO. PROFILE	WELL COMPLETION
		20			DRY, FRIABLE, GRAY SILTY CLAY WITH 15% GRAVEL	[Pattern: Dotted]	[Pattern: Triangles]
		21					
		22					
		23					
		24					
		25					
		26					
		27					
		28					
		29					
		30			1", MOIST GRAY CLAYEY SAND	[Pattern: Dotted]	[Pattern: Triangles]
		31					
		32					
		33					
		34					
		35					
		36					
		37					
		38					
		39					
		40			DRY, FRIABLE GRAY SILTY CLAY WITH 15% GRAVEL	[Pattern: Dotted]	[Pattern: Triangles]
		41					

FEBRUARY-9-97/BJMH 726691MP305-2.DWG

SAND
 BACKFILL

CASING
 SCREEN

BENTONITE
 CEMENT

▽

 INITIAL WATER LEVEL

▽

 STATIC WATER LEVEL

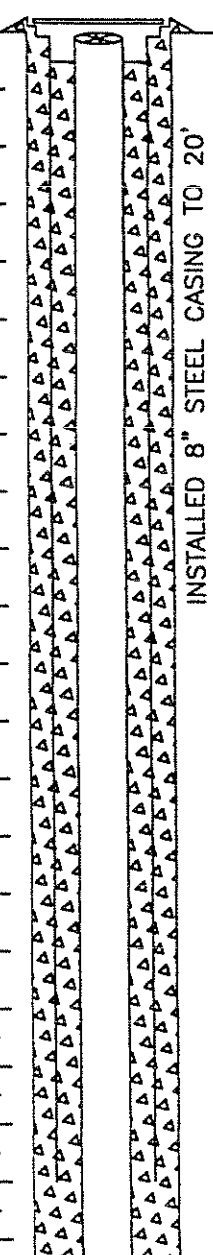
CECOS 087295

LOCATION MAP			PARSONS ENGINEERING SCIENCE LOG		PAGE 3 OF 3		
ELEVATION 905			BORING NUMBER MP-305		LOCATION CECOS		
			DATE 9-14-97		WEATHER 78°, PARTLY CLOUDY		
			LOCATED BY ERIC MYSONA		DRILLED BY BOART LONGYEAR		
			DRILLING METHOD ROTOSONIC FROM 21 TO 53'		SAMPLING METHOD 4" CORE BARREL		
			GRAVEL PACK #5 SILICA SAND		SEAL BENTONITE		
CASING TYPE TYPE 304 STAINLESS STEEL					DIAMETER 2" LENGTH 48'		
SCREEN TYPE STAINLESS STEEL SLOT 0.010"					DIAMETER 2" LENGTH 5'		
					HOLE DIA. 6"		
					TOTAL DEPTH 53'		
SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH (FT)	SAMPLE RECOVERY	PENETRATION RESISTANCE	DESCRIPTION/REMARKS (COLOR, MOISTURE, PLASTICITY, SORTING, SOIL TYPE)	LITHO. PROFILE	WELL COMPLETION
		40			SLIGHTLY MOIST, NON-PLASTIC GRAY SILTY CLAY WITH 15% GRAVEL		
		41					
		42					
		43					
		44					
		45					
		46					
		47					
		48					
		49					
		50			WET GRAY WEATHERED SHALE & LIMESTONE		
		51					
		52					
		53					
		54			2" LIMESTONE AT 51.5'		
		55			SLIGHTLY MOIST GRAY SHALE		
		56			BORING ENDS AT 53'		
		57					
		58					
		59					
		60					
		61					









FEBRUARY-9-97 BTMH 726691MP305-3.DWG

SAND	CASING	BENTONITE	INITIAL WATER LEVEL
BACKFILL	SCREEN	CEMENT	STATIC WATER LEVEL

CEC03 087296

LOCATION MAP		PARSONS ENGINEERING SCIENCE LOG				PAGE 1 OF 2	
ELEVATION 905.3'		BORING NUMBER MP-305A		LOCATION CECOS			
		DATE 9-14-97		WEATHER 74°, PARTLY CLOUDY			
		LOCATED BY ERIC MYSONA		DRILLED BY BOART LONGYEAR			
		DRILLING METHOD 8.25" HSA TO 21'		SAMPLING METHOD 2" SPLITSPOON			
		GRAVEL PACK #5 SILICA SAND		SEAL BENTONITE			
CASING TYPE TYPE 304 STAINLESS STEEL						DIAMETER 2" LENGTH 26'	
SCREEN TYPE STAINLESS STEEL SLOT						0.010" DIAMETER 2" LENGTH 5'	
						HOLE DIA. 13"	
						TOTAL DEPTH 31'	
SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH (FT)	SAMPLE RECOVERY	PENETRATION RESISTANCE	DESCRIPTION/REMARKS (COLOR, MOISTURE, PLASTICITY, SORTING, SOIL TYPE.)	LITHO. PROFILE	WELL COMPLETION
							FLUSH MOUNT PROTECTIVE COVER
		0		300lb	HAMMER		 INSTALLED 8" STEEL CASING TO 20'
		1			2" OF ASPHALT		
		2			DRY GRAVEL PAVING SUB-BASE		
		3			MOIST BROWN SILTY CLAY		
		4					
		5					
		6		9	DRY GRAVEL FRAGMENT IN SPOON		
		7		3			
		8		4			
		9		7			
		10		2	SLIGHTLY MOIST, PLASTIC BROWN & GRAY		
		11		3	SILTY CLAY WITH 5% GRAVEL		
		12		4			
		13		8			
		14		4	DRY, FRIABLE BROWN SILTY CLAY WITH 15% GRAVEL (TILL)		
		15		6			
		16		11			
		17		17			
		18		9			
		19		16			
		20		18	DRY, FRIABLE, GRAY SILTY CLAY WITH 20% GRAVEL (TILL)		
		21		22			
				19			
				15			
				13			
				12			
				9			
				15			
				50/2"			
				39			
				50/1"			

FEBRUARY-9-97/ BTMH 726691MP305A-1.DWG

 SAND	 CASING	 BENTONITE	 INITIAL WATER LEVEL
 BACKFILL	 SCREEN	 CEMENT	 STATIC WATER LEVEL

CECOS 087297

LOCATION MAP		PARSONS ENGINEERING SCIENCE LOG			PAGE 2 OF 2	
BORING NUMBER MP-305A		LOCATION CECOS				
DATE 9-14-97		WEATHER 74°, PARTLY CLOUDY				
LOCATED BY ERIC MYSONA		DRILLED BY BOART LONGYEAR				
DRILLING METHOD ROTOSONIC FROM 20 TO 30'		SAMPLING METHOD 2" SPLITSPOON				
ELEVATION 905.3'		GRAVEL PACK #5 SILICA SAND		SEAL BENTONITE		
CASING TYPE TYPE 304 STAINLESS STEEL			DIAMETER 2"	LENGTH 26'	HOLE DIA. 13"	
SCREEN TYPE STAINLESS STEEL SLOT 0.010"			DIAMETER 2"	LENGTH 5'	TOTAL DEPTH 31'	
SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH (FT)	SAMPLE RECOVERY	PENETRATION RESISTANCE	DESCRIPTION/REMARKS (COLOR, MOISTURE, PLASTICITY, SORTING, SOIL TYPE)	LITHO. PROFILE
		20			SLIGHTLY MOIST, NON-PLASTIC GRAY SILTY CLAY WITH 15% GRAVEL 1" MOIST, GRAY, CLAYEY SAND WET GRAY CLAYEY SAND SLIGHTLY MOIST GRAY SILTY CLAY WITH 15% GRAVEL	
		21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				
		30				
		31			BORING ENDS AT 31'	
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				
		41				

FEBRUARY-9-97 BTMH 726691MP305A-2.DWG

SAND	CASING	BENTONITE	INITIAL WATER LEVEL
BACKFILL	SCREEN	CEMENT	STATIC WATER LEVEL

CECOS 087298

LOCATION MAP		PARSONS ENGINEERING SCIENCE LOG		PAGE 1 OF 2	
BORING NUMBER MP--306A		LOCATION CECOS			
DATE 9-2-97		WEATHER 70°, PARTLY CLOUDY			
LOCATED BY ERIC MYSONA		DRILLED BY BOART LONGYEAR			
DRILLING METHOD 12.25" HSA TO 23'		SAMPLING METHOD 2" SPLITSPOON			
GRAVEL PACK #5 SILICA SAND		SEAL BENTONITE			
ELEVATION 907.8'					
CASING TYPE TYPE 304 STAINLESS STEEL		DIAMETER 2"		LENGTH 22'	
SCREEN TYPE STAINLESS STEEL SLOT		0.010" DIAMETER 2"		LENGTH 6'	
				HOLE DIA. 18"	
				TOTAL DEPTH 35'	

SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH (FT)	SAMPLE RECOVERY	PENETRATION RESISTANCE	DESCRIPTION/REMARKS (COLOR, MOISTURE, PLASTICITY, SORTING, SOIL TYPE.)	LITHO. PROFILE	WELL COMPLETION	
							18" STICK-UP	
		0		300lb	HAMMER			
		1			MOIST, CLAY & GRAVEL FILL MATERIAL			INSTALLED 8" STEEL CASING TO 23'
		2						
		3						
		4						
		5						
		6		4	SLIGHTLY MOIST, PLASTIC, BROWN & GRAY SILTY CLAY, 5% GRAVEL			
		7		6				
		8		9				
		9		11				
		10		8				
		11		12	DRY, BRITTLE, BROWN & GRAY SILTY CLAY WITH 10% GRAVEL (TILL)			
		12		11				
		13		10				
		14		8				
		15		12				
		16		21				
		17		30				
		18		12				
		19		16				
		20		19				
		21		20	MOIST GRAY CLAYEY SAND, WITH 15% GRAVEL DRY, BRITTLE GRAY SILTY CLAY, 15% GRAVEL			
		22		9				
		23		19				
		24		22				
		25		20				
		26		12				
		27		13				
		28		26				
		29		19				
		30		13				
		31		15				
		32		21				
		33		19				
		34		21				
		35		19				
		36		31				
		37		22				

FEBRUARY-9-97 BTMH 726691MP306A-1.DWG

SAND	CASING	BENTONITE	INITIAL WATER LEVEL
BACKFILL	SCREEN	CEMENT	STATIC WATER LEVEL

CECO: 087299

LOCATION MAP		PARSONS ENGINEERING SCIENCE LOG		PAGE 2 OF 2			
BORING NUMBER MP-306A		LOCATION CECOS					
DATE 9-14-97		WEATHER 74°, PARTLY CLOUDY					
LOCATED BY ERIC MYSONA		DRILLED BY BOART LONGYEAR					
DRILLING METHOD ROTASONIC FROM 23 TO 35'		SAMPLING METHOD 2" SPLITSPOON					
ELEVATION 905.3'		GRAVEL PACK #5 SILICA SAND		SEAL BENTONITE			
CASING TYPE TYPE 304 STAINLESS STEEL		DIAMETER 2"		LENGTH 22'			
SCREEN TYPE STAINLESS STEEL SLOT		0.010" DIAMETER 2"		LENGTH 6'			
				HOLE DIA. 13"			
				TOTAL DEPTH 31'			
SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH (FT)	SAMPLE RECOVERY	PENETRATION RESISTANCE	DESCRIPTION/REMARKS (COLOR, MOISTURE, PLASTICITY, SORTING, SOIL TYPE.)	LITHO. PROFILE	WELL COMPLETION
		20					
		21		8	DRY, FRIABLE, GRAY SILTY CLAY WITH 15% GRAVEL		
		22		9			
		23		11			
		24		14			
		25					
		26			DRY, NON-PLASTIC GRAY SILTY CLAY WITH 15% GRAVEL		
		27					
		28					
		29					
		30					
		31			WET, GRAY COARSE SAND WITH 20% GRAVEL, 20% COBBLES		
		32					
		33			DRY NON-PLASTIC, GRAY SILTY CLAY WITH 15% GRAVEL		
		34					
		35					
		36			BORING ENDS AT 35'		
		37					
		38					
		39					
		40					
		41					

FEBRUARY-8-97 BTM 726691MP306A-2.DWG

SAND	CASING	BENTONITE	INITIAL WATER LEVEL
BACKFILL	SCREEN	CEMENT	STATIC WATER LEVEL

CECOS 087300

BOREHOLE LOG

Site Name and Location: CECOS, Aber Road Facility Williamsburg, Ohio		Drilling Methods: 4 1/4" ID Hollow Stem Auger			Boring Number: MP-401A	
Drilling Firm: <i>Jersey West Drilling</i>		DATE	TIME	DEPTH DRILLED (ft)	WATER LEVEL (ft)	
Driller / Rig: <i>Mike Caprioni/Acker Soil Max</i>						
Logged by: <i>David Sugar</i>		Sampling Methods:				
Coordinates: <i>4748.36N 5980.28E</i>		ST = Shelby Tube WS = Waxed Sample SP = Sand Pump DP = Direct Push CT = Cuttings				
Surface Elevation: <i>903.8 ft/MSL</i>		SS = Split Spoon CS = Continuous Sampler C = Coring NS = Not Sampled B = Bailer				
Surface Conditions / Weather: <i>Dry, slight slope, grass covered /70°-80° F, Sunny</i>						

Page 1 of 1

Start	Finish
Time 0851	Time 1050
Date 8/6/12	Date 8/6/12

Remarks: Installed at staked location , 7' west of MP-401B, 30' east of GP-17.

Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
1	903				Installed 7 feet west of MP-401B. See Borehole Log MP-401B for detailed stratigraphic descriptions. 0.0 - 12.0' CLAYEY SANDY SILT. SOIL FILL.		Straight drilled without sampling to 12.0'. Ran 4" steel auger plug to maintain clean open augers.	ML CL
2	902				Change at 2.6'. CLAYEY SILT/SILTY CLAY. SUBSOIL.			CL
3	901							
4	900							
5	899							
6	898	NS			Change at 6.2'. CLAYEY SANDY SILT. TILL.			ML CL
7	897							
8	896							
9	895							
10	894						Strong reaction with HCl.	
11	893				Brown to yellowish brown (10 YR 5/3 to 5/4) CLAYEY SANDY SILT. Trace fine to coarse gravel. Clasts are typically subrounded to angular. Unsorted. Massive to weak platy texture. Very hard to hard. Medium plasticity and toughness. High dry strength. Moist to damp. Weathered. TILL.		At 12.0' switch over to 2" OD, 2' drive split spoon, driven with 300 lb. manual hammer. Plug and plug returns were dry. No water in augers.	
12	892			6				
13	891	SS-1	2.0	8			Desiccation cracks present, become more pronounced below 13.4'. Near horizontal to about 45°. Trace iron oxide and possible manganese oxide along crack faces. Does not appear wet.	
14	890			13	Below 13.4' start picking up gray to dark gray (10 YR 5/1 to 4/1) color. Somewhat mottled appearance. Change at 14.45'.			
15	889	SS-2	1.9	14				
16	888			7	Gray to brown (10 YR 5/1 to 5/3) SAND to SAND and GRAVEL. Fine to coarse sand. Gravel up to 1/2" diameter. Well graded. Dense. Trace silt. Wet. Sand and gravel content is usually subrounded with high carbonate content. Slightly weathered to unweathered. Change at 15.4'.		Overlying contact is sharp ~5° angle. 0.5' oxidized till at contact. Strong reaction with HCl. Underlying contact is sharp ~15° angle.	SW GW
17	887			15			15.4' - 15.45 till is oxidized brown. Strong reaction with HCl.	ML CL
18	886			18	Gray to dark gray (10 YR 5/1 to 4/1) CLAYEY SANDY SILT. Trace gravel, generally less than 1/2" diameter, angular to subrounded. Unsorted. Very hard. Medium plasticity and toughness. High dry strength. Moist to damp. TILL. Bottom of Borehole = 16.0'.			
19	885			12				
884					Monitoring Well MP-401A installed in borehole. See Monitoring Well Installation Report MP-401A for details.			

Monitoring Well Installation Report

Site Name and Location: *CECOS, Aber Road Facility, Williamsburg, Ohio* Completion Date: *8/6/12*

Coordinates: *4748.36N 5980.28E*

Borehole Depth (ft): *16.0*

Elevation Top of Casing (ft/MSL): *906.37*

Borehole Diameter (in): *8"*

Elevation Ground Surface (ft/MSL): *903.8*

Drilling Methods: *4 1/4" ID Hollow Stem Auger*

Installed By: *Mike Caproni/Jersey West Drilling, Inc.*

Completed Drilling: *8/6/12*

Supervised By: *David Sugar/Eagon & Associates, Inc.*

Drilling Water Used (gals): *100*

Well Design

Component	Materials	Depth (LSD)	Elevation
Well Protector	4" Diameter Steel with Locking Lid	-2.9 - 2.1	906.7 - 901.7
Riser	2" Diameter Schedule 40 PVC	-2.6 - 13.7	906.4 - 890.1
Surface Seal	24" Diameter Concrete	-0.5 - 2.5	904.3 - 901.3
Grout Seal	"Pure Gold" Bentonite Grout	2.5 - 8.9	901.3 - 894.9
Bentonite Seal	3/8" Bentonite Chips	8.9 - 11.3	894.9 - 892.5
Sand Pack	No. 5 "Global" Silica Sand	11.3 - 15.9	892.5 - 887.9
Screen	2" Diameter Schedule 40 PVC 10-slot	13.7 - 15.7	890.1 - 888.1
Well Point Blank	2" Diameter Schedule 40 PVC, Slip Cap	15.7 - 15.9	888.1 - 887.9
Sand Pack Bottom	No. 5 "Global" Silica Sand	15.9 - 16.0	887.9 - 887.8

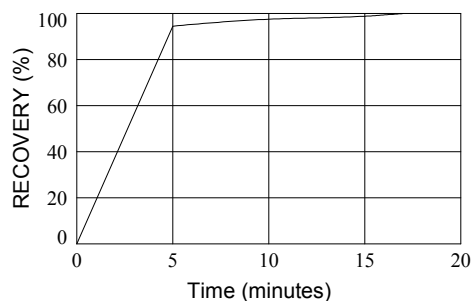
Well Development

Well Depth (ft, TOC): <i>18.5</i>	Depth to Water (ft, TOC): <i>11.18</i>	Well Volume (gals): <i>1.2</i>	Volume Purged (gals): <i>151.3</i>
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Development Method:
Surge block, bailer, bladder pump, grundfos pump

Date	Time	Cumulative Volume Removed (gals)	Temp (°C)	Specific Conductivity (µmhos/cm)	pH (S.U.)	Turbidity (NTU)
8/8/12	1115	28.00	17.2	1512	7.07	>1000
8/8/12	1815	83.59	19.0	1512	6.94	585.0
8/9/12	1422	102.18	19.3	1486	6.92	9.0
8/10/12	1306	114.82	17.5	1510	7.25	468.0
8/10/12	1336	125.92	17.4	1514	6.07	104.0
8/12/12	1436	151.32	16.3	1532	6.60	145.0

Recovery Data



Sampling Equipment:

Bladder pump

Comments:

Well riser and screen are "Johnson" flush threaded sections with O-ring seals. Bentonite grout mixed to 30% specifications. Well bottom secured with stainless steel screws. Drilling water used for flushing, most returned to surface.







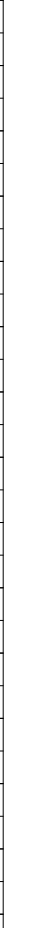
Boring depth=16.0 ft.

BOREHOLE LOG

Site Name and Location: CECOS, Aber Road Facility Williamsburg, Ohio		Drilling Methods: 4 1/4" ID Hollow Stem Auger			Boring Number: MP-401B	
Drilling Firm: <i>Jersey West Drilling</i>		DATE	TIME	DEPTH DRILLED (ft)	WATER LEVEL (ft)	
Driller / Rig: <i>Mike Caproni/Acker Soil Max</i>						Page 1 of 2
Logged by: <i>David Sugar</i>		Sampling Methods:				Start
Coordinates: <i>4749.87N 5973.38E</i>		ST = Shelby Tube WS = Waxed Sample SP = Sand Pump DP = Direct Push CT = Cuttings				Finish
Surface Elevation: <i>904.1 ft/MSL</i>		SS = Split Spoon CS = Continuous Sampler C = Coring NS = Not Sampled B = Bailer				Time 0900
Surface Conditions / Weather: <i>Slight slope, grass covered / 70°-93°F, Partly Cloudy to Sunny</i>						Time 1630
						Date 8/3/12
						Date 8/3/12

Remarks: Installed at staked location approximately 35' west of GP-17.

Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
1	903	SS-1	0.5	3	Brown to dark grayish brown (10 YR 4/3 to 3/3) CLAYEY SANDY SILT. Variable composition. Trace gravel and possible cobbles. Soft to stiff. Medium toughness and dry strength. Generally high dry strength. Unsorted. Damp. Trace roots. Weathered. SOIL FILL.		Continuous 2" OD, 2' drive split spoon sampling. 300 lb manual hammer. ~8" diameter borehole. Ran 4" steel auger plug while augering. Strong to slight reaction with HCl.	ML CL
2	902			2	Change at 2.6'.			
3	901	SS-2	1.3	2	Gray to light olive brown (2.5 Y 5/1 to 5/3) and dark grayish brown to olive brown (2.5 Y 4/2 to 4/3) CLAYEY SILT to SILTY CLAY. Few to little sand. Trace fine gravel. Clasts are generally subrounded to angular and highly weathered. Unsorted to weak layered/mottled appearance. Trace roots. Zones of gray reduction. High plasticity, toughness, and dry strength. Moist. Weathered. SUBSOIL.		No reaction with HCl. Possibly CH in part. 2.6' - 2.9' Brownish gray topsoil zone. Appears in place. Gravel content increasing with depth.	CL
4	900			4				
5	899	SS-3	1.3	3				
6	898			6	Change at 6.2'			
7	897	SS-4	1.6	5	Brown to yellowish brown (10 YR 5/3 to 5/6) and brown to dark yellowish brown (10 YR 4/3 to 4/4) CLAYEY SANDY SILT. Sand content varies from fine to coarse. Trace gravel from fine to coarse. Clasts vary between subrounded to angular. Unsorted. Mottled to weak layered appearance. Hard to very hard. Medium plasticity and toughness. High dry strength. Damp to moist. Weathered. TILL.		Strong reaction with HCl. Trace roots and associated gray reduction. Possibly poorly developed desiccation cracks. Difficult to split sample. Very hard. Drills very hard. Continues to be damp to dry. No water in borehole.	ML CL
8	896			6				
9	895	SS-5	1.9	13	Below 9.2' fairly consistent brown to yellowish brown (10 YR 5/3 to 5/4) color. No roots observed.		Some clasts are highly to completely weathered.	
10	894			20				
11	893	SS-6	1.7	15	Below 12.5' desiccation cracks become prominent. Near vertical to horizontal. Trace reddish brown iron oxide and black manganese oxide on crack faces. No indication of water. Continues to be damp to moist.		Continues to have strong reaction with HCl. Underlying contact transitions over 0.5".	
12	892			6	Below 13.3' becomes mottled with gray to dark gray (10 YR 5/1 to 4/1) color. Transitioning to unweathered. Yellowish brown color associated with cracks and weathering. Moisture content may have increased slightly. Still damp to moist.			
13	891	SS-7	2.0	12	Change at 14.2'			
14	890			11	Gray to brown (10 YR 5/1 to 5/3) fine to coarse SAND. Stratified, layered to banded appearance. Silt content is variable, trace to little. Generally becomes coarse with depth. Trace to no gravel. Wet. Dense. Moderately weathered. Generally well graded. Underlying contact is sharp, apparent horizontal.		SM and possibly ML classification in part. 14.2' - 15.1' Generally fine to medium sand. Trace to little silt. Rapid dilatancy in part. 15.1' - 15.4' Generally medium to coarse sand with gravel.	SW SM
15	889	SS-8	1.9	15	Change at 16.4'			
16	888			9	Grayish brown to brown (10 YR 5/2 to 5/3) CLAYEY SANDY SILT. Trace gravel, generally fine, subrounded to angular. Medium plasticity and toughness. High dry strength. Very hard. Unsorted. Massive to platy appearance. Damp. Slightly weathered to unweathered. TILL.		No desiccation fractures observed. SS-11 drive bouncing, possibly on cobble. No additional penetration. Very indurated.	CL ML
17	887	SS-9	2.0	16				
18	886			24				
19	885	SS-10	0.5	28				
		SS-11	0.4	86				
		SS-12	0.9	33/4				
				52				
				100/4				

CECOS, Aber Road Facility Williamsburg, Ohio					BOREHOLE LOG		Boring Number MP-401B	
Remarks: Installed at staked location approximately 35' west of GP-17.								
Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
21	883	SS-13	0.9	25 58	Grayish brown to brown (10 YR 5/1 to 5/2) CLAYEY SANDY SILT. TILL (cont'd).		Continues to be very hard. Picking up stronger gray color hues. Possibly slightly less weathered.	CL ML
		NS						
22	882	SS-14	1.8	23 24	Below 23.3' color changes to gray (10 YR 5/1). Change at 23.8'.		Underlying contact is sharp, apparent horizontal.	
23	881			78 48				
24	880	SS-15	1.7	23 38 40	Gray (10 YR 6/1 to 5/1) SAND and GRAVEL. Trace to few silt. Gravel generally less than 1/2" diameter and subrounded. Well graded. Dense. Wet.		Possibly SM in part. Trace cobbles.	GW GM
25	879			50				
26	878	SS-16	1.3	10 19	Grading coarser and cleaner with depth.		SS-16, 0.9' of heave in spoon. SS-16 interval augered like sand and gravel.	
27	877			19 23				
28	876	SS-17	1.6	9 19 23	Below 27.5' silt content increasing. Gravel up to 1" diameter. Very dense. Probably GM classification. Underlying contact is sharp, apparent horizontal. Change at 29.4'.		Driller indicated till. Stiff drilling at 29.4'.	
29	875			40				
30	874	NS			Gray (10 YR 5/1 to 4/1) CLAYEY SANDY SILT. Trace gravel. Unsorted. Very hard. Medium plasticity and toughness. High dry strength. Damp to moist. Unweathered. TILL. Bottom of Borehole = 29.8'.		Auger plug sample was 0.2' of till.	CL ML
31	873				Installed Monitoring Well MP-401B in Borehole. See Monitoring Well Installation Report for MP-401B for Details. Prior to setting well, bailed 108 gallons out of augers to clean borehole. Pulled sand into augers, added 100 gallons water to flush augers clean prior to setting well. Most water returned to surface while flushing.			
32	872							
33	871							
34	870							
35	869							
36	868							
37	867							
38	866							
39	865							
40	864							
41	863							
42	862							
43	861							
44	860							

Monitoring Well Installation Report

Site Name and Location: *CECOS, Aber Road Facility, Williamsburg, Ohio* Completion Date: *8/3/12*

Coordinates: *4749.87N 5973.38E* Borehole Depth (ft): *29.8*

Elevation Top of Casing (ft/MSL): *906.56* Borehole Diameter (in): *8"*

Elevation Ground Surface (ft/MSL): *904.1* Drilling Methods: *4 1/4" ID Hollow Stem Auger*

Installed By: *Mike Caproni/Jersey West Drilling, Inc.* Completed Drilling: *8/3/12*

Supervised By: *David Sugar/Eagon & Associates, Inc.* Drilling Water Used (gals): *100*

Well Design

Component	Materials	Depth (LSD)	Elevation
Well Protector	4" Diameter Steel with Locking Lid	-2.8 - 2.2	906.9 - 901.9
Riser	2" Diameter Schedule 40 PVC	-2.5 - 24.3	906.6 - 879.8
Surface Seal	24" Diameter Concrete	-0.5 - 2.5	904.6 - 901.6
Grout Seal	"Pure Gold" Bentonite Grout	2.5 - 19.5	901.6 - 884.6
Bentonite Seal	3/8" Bentonite Chips	19.5 - 21.5	884.6 - 882.6
Sand Pack	No. 5 "Global" Silica Sand	21.5 - 29.5	882.6 - 874.6
Screen	2" Diameter Schedule 40 PVC 10-slot	24.3 - 29.0	879.8 - 875.1
Well Point Blank	2" Diameter Schedule 40 PVC Cap	29.0 - 29.5	875.1 - 874.6
Sand Pack Bottom	No. 5 "Global" Silica Sand	29.5 - 29.8	874.6 - 874.3

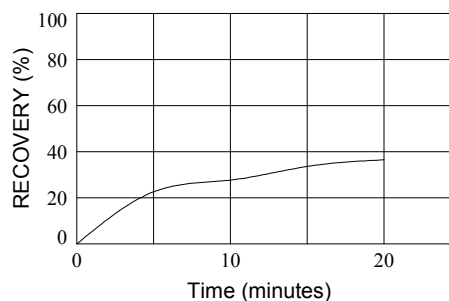
Well Development

Well Depth (ft, TOC): *32.0* Depth to Water (ft, TOC): *8.67* Well Volume (gals): *3.8* Volume Purged (gals): *630.0*

Development Method:
Surge block, bailer, grundfos pump

Date	Time	Cumulative Volume Removed (gals)	Temp (°C)	Specific Conductivity (µmhos/cm)	pH (S.U.)	Turbidity (NTU)
8/8/12	1405	1.00	-	-	-	>1000
8/8/12	1612	259.00	15.6	1145	7.32	>1000
8/8/12	1705	336.00	15.1	1154	7.40	74.3
8/8/12	1720	388.50	15.0	1164	7.38	14.0
8/8/12	1809	448.0	15.4	1144	7.31	29.5
8/9/12	0813	630.0	15.1	1149	6.68	8.2

Recovery Data



Sampling Equipment:

Bladder pump

Comments:

Well riser and screen are "Johnson" flush threaded sections with O-ring seals. Bentonite grout mixed to 30% specifications. Removed 108 gallons water from borehole prior to setting well. Strong well. Recovery rate deceptive due to minimal drawdown.

Boring depth=29.8 ft.

BOREHOLE LOG

Site Name and Location: CECOS, Aber Road Facility Williamsburg, Ohio		Drilling Methods: 4 1/4" ID Hollow Stem Auger		Boring Number: MP-402A	
Drilling Firm: <i>Jersey West Drilling</i>		DATE	TIME	DEPTH DRILLED (ft)	WATER LEVEL (ft)
Driller / Rig: <i>Danny Caproni/CME-550</i>					
Logged by: <i>David Sugar</i>		<div>Sampling Methods:</div> <div> ST = Shelby Tube WS = Waxed Sample SP = Sand Pump DP = Direct Push CT = Cuttings </div> <div> SS = Split Spoon CS = Continuous Sampler C = Coring NS = Not Sampled B = Bailer </div>			
Coordinates: <i>5113.71N 6599.53E</i>		Start		Finish	
Surface Elevation: <i>905.9 ft/MSL</i>		Time <i>0915</i>		Time <i>1200</i>	
Surface Conditions / Weather: <i>Grass covered, flat, dry /75°-90°F, Sunny to Partly Cloudy</i>		Date <i>8/9/12</i>		Date <i>8/9/12</i>	
Remarks: Installed on staked location, ~44' south west of MP-234R. Monitoring Well MP-402A installed in borehole. See Monitoring Well Installation Report MP-402A.					

Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
1	905	SS-1	1.3	2	Gray to yellowish brown (10 YR 5/1 to 5/6) and dark gray to dark yellowish brown (10 YR 4/1 to 4/6) SILTY CLAY. Trace to few sand. Trace (rare) gravel, generally fine, angular to subrounded. Mottled to weak layered appearance. Soft to medium stiff. High plasticity, toughness and dry strength. Moist. Weathered. SUBSOIL.		Continuous 2" OD, 2' drive split spoon sampling, 300 lb. manual hammer. 8 1/4" diameter borehole.	CL
2	904		3					
3	903	SS-2	1.7	2				
4	902		4					
5	901	SS-3	1.4	2	0.0-0.4' brown topsoil zone. May be disturbed. Slight reaction with HCl. Trace roots.		No reaction with HCl. Possibly CH classification in part. Trace roots throughout. Below 4.0' starting to pick up greenish gray color (5 GY 6/1 to 5/1). Still mottled. Trace black (manganese oxide) precipitate. No clear structure development.	
6	900		3					
7	899	SS-4	1.95	2				
8	898		3					
9	897	SS-5	1.8	2	Below 4.0' sand content increasing slightly with depth. Gravel content is still trace (rare).		Below 7.0' slight reaction with HCl.	
10	896		2					
11	895	SS-6	2.0	2				
12	894		2					
13	893	SS-7	2.0	2	Grayish brown to yellowish brown (10 YR 5/2 to 5/4) and dark grayish brown to dark yellowish brown (10 YR 4/2 to 4/4) CLAYEY SANDY SILT. Trace gravel up to 1 1/2" diameter, angular to subrounded. Unsorted. Weak layered to massive appearance. Very hard. Damp. Weathered. TILL.		Strong reaction with HCl.	ML CL
14	892		12					
15	891	SS-8	2.0	22				
16	890		25					
17	889	SS-9	2.0	13	Below 8.5' trace poorly developed desiccation cracks. Trace yellowish brown oxidation/iron oxide precipitate. Damp to dry.		No indication of roots. No indication of water. Drilled very hard.	
18	888		19					
19	887	NS		13				
			14					
17	889	SS-9	2.0	11	10.0' - 11.1' near vertical to 85° desiccation crack(s). Well developed. Face oxidized reddish brown, iron oxide precipitate. Damp to dry.		Strong reaction with HCl. Very hard. Damp. No indication of water in augers.	
18	888		14					
19	887		31					
18	888	NS			At 11.5' apparent horizontal desiccation break. Face is oxidized reddish brown, iron oxide precipitate. Damp to dry.		Underlying contact is gradational, over 0.05'.	SM
19	887							
19	887				Below 11.9' primarily gray to dark gray (10 YR 5/1 to 4/1) color. Becoming unweathered.		Strong reaction with HCl. Very hard. Damp. No indication of water in augers.	ML CL
19	887				Change at 16.8'.		Underlying contact is gradational, over 0.05'.	SM
19	887				Gray to dark gray (10 YR 5/1 to 4/1) SILTY SAND. Generally fine grained. Dense. Rapid to no dilatancy. Poor to well graded. Wet. 17.1' - 17.3' coarse sand with gravel (few silt).		Strong reaction with HCl. Very hard. Damp. No indication of water in augers.	ML CL
19	887				Change at 17.3'.		Underlying contact is gradational, over 0.05'.	SM
19	887				Grayish brown to dark grayish brown (10 YR 4/2 to 4/3) CLAYEY SANDY SILT. Trace gravel up to 1" diameter. Unsorted. Very hard. Medium plasticity and toughness. High dry strength. Unweathered. Damp. TILL.		Underlying contact is gradational, over 0.05'.	SM
19	887				Bottom of Borehole = 18.5'.		Underlying contact is gradational, over 0.05'.	SM

Monitoring Well Installation Report

Site Name and Location: *CECOS, Aber Road Facility, Williamsburg, Ohio* Completion Date: *8/9/12*

Coordinates: *5113.71N 6599.53E*

Borehole Depth (ft): *18.5*

Elevation Top of Casing (ft/MSL): *908.42*

Borehole Diameter (in): *8 1/4"*

Elevation Ground Surface (ft/MSL): *905.9*

Drilling Methods: *4 1/4" ID Hollow Stem Auger*

Installed By: *Danny Caprioni/Jersey West Drilling, Inc.*

Completed Drilling: *8/9/12*

Supervised By: *David Sugar/Eagon & Associates, Inc.*

Drilling Water Used (gals): *None*

Well Design

Component	Materials	Depth (LSD)	Elevation
Well Protector	4" Diameter Steel with Locking Lid	-2.8 - 2.2	908.7 - 903.7
Riser	2" Diameter Schedule 40 PVC	-2.5 - 14.8	908.4 - 891.1
Surface Seal	24" Diameter	-0.4 - 2.5	906.3 - 903.4
Grout Seal	"Pure Gold" Bentonite Grout	2.5 - 13.4	903.4 - 892.5
Bentonite Seal	3/8" Bentonite Chips	13.4 - 13.8	892.5 - 892.1
Sand Pack	No. 5 "Global" Silica Sand	13.8 - 18.4	892.1 - 887.5
Screen	2" Diameter Schedule 40 PVC 10-slot	14.8 - 18.2	891.1 - 887.7
Well Point Blank	2" Diameter Schedule 40 PVC Slip Cap	18.2 - 18.4	887.7 - 887.5
Sand Pack Bottom	Formation Sand	18.4 - 18.5	887.5 - 887.4

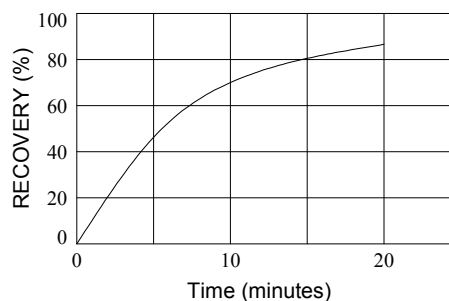
Well Development

Well Depth (ft, TOC): *21.0* Depth to Water (ft, TOC): *4.82* Well Volume (gals): *2.6* Volume Purged (gals): *100.6*

Development Method:
Surge block, bailer, grundfos pump

Date	Time	Cumulative Volume Removed (gals)	Temp (°C)	Specific Conductivity (µmhos/cm)	pH (S.U.)	Turbidity (NTU)
8/10/12	1110	10.0	17.0	745	7.59	>1000
8/16/12	0800	40.50	16.2	2770	7.08	541.0
8/28/12	1424	51.55	16.4	1907	7.01	6.5
8/29/12	1009	79.55	15.0	1921	6.87	18.1
8/29/12	1027	88.55	-	-	-	>1000
8/29/12	1434	100.55	-	-	-	48.0

Recovery Data



Sampling Equipment:

Bladder pump

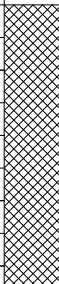
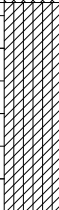

Comments:

Well riser and screen are "Johnson" flush threaded sections with o-ring seals. Bentonite grout mixed to 30% specifications. 18.4'-18.5' Natural filter pack. Well point blank secured with 4 stainless steel screws.

Boring depth=18.5 ft.

BOREHOLE LOG							
Site Name and Location: CECOS, Aber Road Facility Williamsburg, Ohio		Drilling Methods: 4 1/4" ID Hollow Stem Auger			Boring Number: MP-403A		
Drilling Firm: <i>Jersey West Drilling</i>		DATE	TIME	DEPTH DRILLED (ft)	WATER LEVEL (ft)		
Driller / Rig: <i>Danny Caprioni/CME-550</i>					<i>Page 1 of 1</i>		
Logged by: <i>David Sugar</i>		<u>Sampling Methods:</u> ST = Shelby Tube WS = Waxed Sample SP = Sand Pump DP = Direct Push CT = Cuttings SS = Split Spoon CS = Continuous Sampler C = Coring NS = Not Sampled B = Bailor				Start	Finish
Coordinates: <i>5049.52N 7999.42E</i>						<i>Time</i> <i>0915</i>	<i>Time</i> <i>1130</i>
Surface Elevation: <i>909.7 ft/MSL</i>						<i>Date</i> <i>8/8/12</i>	<i>Date</i> <i>8/8/12</i>
Surface Conditions / Weather: <i>Grass covered, moderate slope, dry /75°-90° F, Sunny</i>							

Remarks: Installed on staked location, ~12' E of MP-214R and ~20' E of MP-214A.

Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
1	909	SS-1	1.2	2 5 4	Gray, light grayish brown, brown and yellowish brown (10 YR 6/1 to 6/6 and 5/1 to 5/6) CLAYEY SILT to SILTY CLAY. Few to little sand. Trace fine gravel. Deformed appearance. Soft to medium stiff. High plasticity, toughness, and dry strength. Moist. Weathered. SOIL FILL (subsoil and till intermixed).		Continuous 2" OD, 2' drive split spoon sampling driven with 140 lb. manual hammer. 8 1/4" borehole. Slight to strong reaction with HCl. Possibly ML-CL in part. Underlying contact is sharp.	CL
2	908		4					
3	907	SS-2	1.4	3 4 4				
4	906		6					
					Change at 4.3'.			
5	905	SS-3	1.5	2 4 6	Gray/grayish brown (10 YR 5/1 to 5/2) to gray/light olive brown (2.5 Y 5/1 to 5/4) SILTY CLAY. Trace to few sand. Trace gravel up to 1" diameter. Clasts generally vary from subangular to angular and are highly weathered to completely weathered. Moist. High plasticity, toughness, and dry strength. SUBSOIL.		No reaction with HCl. Trace roots with associated gray reduction. Possibly CH classification in part. Underlying contact is transitional over 0.2', may be as high as 7.3'.	CL
6	904		10					
7	903	SS-4	1.7	4 5 7				
	902		10					
					Change at 7.5'.			
8					Dark yellowish brown (10 YR 4/4, 4/6, 3/4, and 3/6) CLAYEY SANDY SILT. Sand content varies from fine to coarse, subrounded to angular. Trace gravel up to 1" diameters, generally subangular. Most clasts are highly weathered to completely weathered. Moist to damp. Medium plasticity and toughness. High dry strength. Unsorted. Mottled to massive appearance. Very hard. Weathered. TILL.		7.5' - 8.4' No to very slight reaction with HCl. Below 8.4' strong reaction with HCl. No indication of water.	
9	901	SS-5	2.0	4 6 9				
10	900		15					
	899		10 16 25					
11	899	SS-6	1.8		Below 11.0' trace gray reduction around some clasts.		7.5' - 10.9' Poorly developed desiccation cracks with iron oxide and possibly manganese oxide precipitates coating some clasts. Below 10.9' the occurrences of desiccation cracks is decreasing. Below 14.0' switched to 300 lb. manual hammer.	
12	898			38	From 11.6' - 11.65 brown sandy silt with gravel. Damp.			
13	897	SS-7	1.65	20 35 40	Below 12.1' start picking up grayish brown (10 YR 5/2) color hues. Below 12.7' predominantly gray to grayish brown (10 YR 5/1 to 5/2) color with yellowish brown oxidation along horizontal planes. Trace iron oxide deposition.			
14	896			52				
15	895	SS-8	1.7	7 16 17	Desiccation cracks at 14.75', 15.4'-15.55', 15.7', 16.0'-16.3', 17.0', 17.3', 18.4', 18.5'-18.7' and 19.0'. Oxidized yellowish brown/brown with iron oxide precipitates.			
16	894			18				
17	893	SS-9	1.35	5 7 9				
18	892			11				
19	891	SS-10	1.3	5 7 8	Below 18.0' possibly a trace of water. Driller noted slightly easier drilling. 11:30-12:30 no water accumulated inside augers prior to setting well.		Well MP-403A installed in borehole. See monitoring well installation report MP-403A for details.	
	890			10	Bottom of Borehole = 20.0'			

Monitoring Well Installation Report

Site Name and Location: *CECOS, Aber Road Facility, Williamsburg, Ohio* Completion Date: *8/8/12*

Coordinates: *5049.52N 7999.42E*

Borehole Depth (ft): *20.0*

Elevation Top of Casing (ft/MSL): *912.37*

Borehole Diameter (in): *8"*

Elevation Ground Surface (ft/MSL): *909.7*

Drilling Methods: *4 1/4" ID Hollow Stem Auger*

Installed By: *Danny Caprioni/Jersey West Drilling, Inc.*

Completed Drilling: *8/8/12*

Supervised By: *David Sugar/Eagon & Associates, Inc.*

Drilling Water Used (gals): *None*

Well Design

Component	Materials	Depth (LSD)	Elevation
Well Protector	4" Diameter Steel with Locking Lid	-2.8 - 2.2	912.5 - 907.5
Riser	2" Diameter Schedule 40 PVC	-2.6 - 11.0	912.3 - 898.7
Surface Seal	24" Diameter Concrete	-0.5 - 1.5	910.2 - 908.2
Bentonite Seal	3/8" Bentonite Chips	1.5 - 4.5	908.2 - 905.2
Grout Seal	"Pure Gold" Bentonite Grout	4.5 - 8.0	905.2 - 901.7
Bentonite Seal	3/8" Bentonite Chips	8.0 - 10.0	901.7 - 899.7
Sand Pack	No. 5 "Global" Silica Sand	10.0 - 16.1	899.7 - 893.6
Screen	2" Diameter Schedule 40 PVC 10-slot	11.0 - 15.7	898.7 - 894.0
Well Point Blank	2" Diameter Schedule 40 PVC Cap	15.7 - 16.1	894.0 - 893.6
Sand Pack Bottom	No. 5 "Global" Silica Sand	16.1 - 20.0	893.6 - 889.7
Bentonite Seal	3/8" Bentonite Chips	17.0 - 20.0	892.7 - 889.7

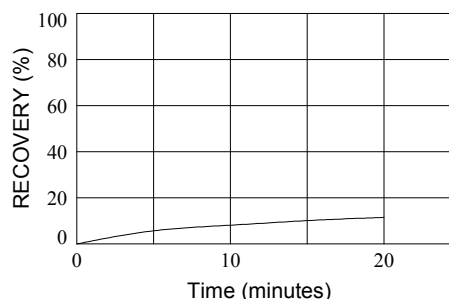
Well Development

Well Depth (ft, TOC): <i>18.7</i>	Depth to Water (ft, TOC): <i>8.71</i>	Well Volume (gals): <i>1.6</i>	Volume Purged (gals): <i>25.0</i>
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Development Method:
Surge block, bailer, bladder pump

Date	Time	Cumulative Volume Removed (gals)	Temp (°C)	Specific Conductivity (µmhos/cm)	pH (S.U.)	Turbidity (NTU)
8/10/12	0822	3.00	-	-	-	>1000
8/16/12	1739	18.00	15.7	3200	7.07	186.0
8/17/12	0850	20.63	16.8	3260	7.17	338.0
8/17/12	0910	21.15	16.7	3040	7.35	99.3
8/17/12	0925	21.54	16.7	2870	7.40	43.0
8/23/12	1221	21.54	-	-	-	11.7

Recovery Data



Sampling Equipment:

Bladder pump

Comments:

Well riser and screen are "Johnson" flush threaded sections with o-ring seals. Bentonite grout mixed to 30% specifications. 2" Slip-couple casing repair installed at 4.1 bgs; secured with SS screws and Teflon tape.

Boring depth=20.0 ft.

BOREHOLE LOG

Site Name and Location: CECOS, Aber Road Facility Williamsburg, Ohio		Drilling Methods: 4 1/4" ID Hollow Stem Auger				Boring Number: MP-404	
Drilling Firm: <i>Jersey West Drilling</i>		DATE	TIME	DEPTH DRILLED (ft)	WATER LEVEL (ft)		
Driller / Rig: <i>Mike Caproni/Acker Soil Max</i>							
Logged by: <i>David Sugar</i>		<u>Sampling Methods:</u> ST = Shelby Tube WS = Waxed Sample SP = Sand Pump DP = Direct Push CT = Cuttings SS = Split Spoon CS = Continuous Sampler C = Coring NS = Not Sampled B = Bailer				<i>Page 1 of 5</i>	
Coordinates: <i>5231.98N 8108.08E</i>							
Surface Elevation: <i>910.2 ft/MSL</i>						Start	Finish
Surface Conditions / Weather: <i>Grass covered, slight slope / 80 - 90° F, Sunny</i>						<i>Time</i> 0903	<i>Time</i> 1553
						<i>Date</i> 7/30/12	<i>Date</i> 8/1/12

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








Remarks: Installed at staked location, 15' west-northwest of 12-5A, approximately 14' off access road.

Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
1	910	SS-1	1.4	3	Brown to dark grayish brown (10YR 4/3 to 3/3) SANDY SILT. Trace to few coarse sand. Trace gravel, up to 3/4" diameter, angular to subrounded. Few to little clay. Moist to damp. Low plasticity, dry strength, and toughness. Unsorted. Trace roots 0.0 - 0.5'. Moderately weathered. SOIL FILL.		Continuous 2" OD, 2' drive split-spoon sampling. 300 lb manual hammer. 8-inch diameter borehole. Strong reaction with HCl.	ML
	909			4				
	908			3				
2	908	SS-2	1.5	2	Change at 2.5'. Gray to light olive brown (2.5Y 5/1 to 5/3) and dark grayish brown to olive brown (2.5Y 4/2 to 4/3) CLAYEY SILT to SILTY CLAY. Few to little sand. Trace fine gravel. Gravel and coarse sand clasts are angular to subrounded. High plasticity, toughness, and dry strength. Moist. weak layered to mottled appearance with gray reduced areas. Reduced areas appear to be associated with roots. Weathered, some clasts are fully weathered. Hard. Weathered SUBSOIL.		Ran 4" auger plug while augering between SS drives. No to very slight reaction with HCl. Possibly could classify as highly weathered till. Possibly CL-CH in part.	CL
3	907			2				
4	906			3				
5	905	SS-3	0.8	2	Below 6.4' gray color hue increasing. Moisture content increased slightly. Slightly softer, firm. Slight to no reaction with acid. Trace roots. Still has mottled to weak layered appearance.		SS-3 sampler blocked with coarse gravel fragment. Majority of recovery is disturbed. No indication of water in augers.	
6	904			3				
7	903			4				
8	902	SS-4	1.25	2	Below 8.0' trace manganese and iron oxide mottling. Possible iron oxide concretions (<1/4" diameter). Change at 9.1'.		Underlying contact is transitional from 9.0' - 9.1'.	
9	901			2				
	900			3				
10	899	SS-5	1.7	3	Brown to yellowish brown (10YR 5/3 to 5/6) and brown to dark yellowish brown (10YR 4/3 to 4/4) CLAYEY SANDY SILT. Sand content generally in the little range, fine to coarse. Trace gravel up to 3/4" diameter, angular to subrounded. Unsorted, somewhat mottled appearance with yellowish color hues decreasing with depth. Hard to very hard, difficult to split sample. Medium plasticity. Low to medium toughness. High dry strength. Weathered TILL.		Strong reaction with HCl. Possibly CL in part. Prior to augering 10' - 12', borehole measured dry. Trace iron oxide precipitates. Weak development of desiccation cracks, appear associated with iron oxide areas.	CL ML
11	898			4				
12	897			11				
13	896	SS-6	1.8	15	Below 12.3' color predominately gray to grayish brown (10YR 5/1 to 5/2). Moderately to slightly weathered. Becomes very hard. Moisture content dropped slightly to damp. Gravel clasts, up to 1" diameter. Consistent strong reaction with HCl. Clasts are primarily carbonate with occasional shale and igneous clasts.		Below 12.3' desiccation cracks become more prominent, associated with yellowish brown oxidation and iron oxide deposition within gray till. Near vertical to horizontal, frequency decreases with depth. No indication of water. Often desiccation cracks do not appear open.	
14	895			9				
15	894			10				
16	893	SS-7	1.9	13	Below 16.0' moisture content increased slightly, dry to moist. Continues to be very hard. Primarily gray to dark gray (10YR 5/1 to 4/1) color.		17.0' - 17.5' near vertical desiccation crack with iron oxide on face (~1mm weathering halo).	
17	892			15				
18	891			7				
19	891	SS-8	2.0	9	Becomes unweathered below 17.5', no oxidation or desiccation cracks observed. Consistent massive unsorted appearance.		No indication of water, sounded dry after SS-10 drive. Added 2 gal of water augering.	
				11				
				15				



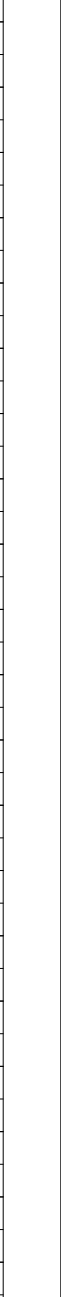
Eagon & Associates, Inc.

CECOS, Aber Road Facility Williamsburg, Ohio					BOREHOLE LOG		Boring Number MP-404	
Remarks: Installed at staked location, 15' west-northwest of 12-5A, approximately 14' off access road.								
Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
21	890	SS-11	2.0	7	Gray to dark gray (10YR 5/1 to 4/1) CLAYEY SANDY SILT. TILL. (Continued).		Continues to be unweathered and very hard. Damp to moist. No indication of water. Possibly CL classification.	CL ML
	889			10				
	888			11				
22	888	SS-12	2.0	12	Below 24.0' slight color change to grayish brown to dark grayish brown (10YR 5/2 to 4/2). No apparent compositional change. Continues to have strong reaction to HCl.		SS-13 initially bumped sampler back. No recovery. Reinserted sampler to pick up recovery (slightly disturbed sample). Only used rig hydraulics for pushing spoon to sample depth.	
	887			5				
	886			7				
23	887	SS-13	1.4	9	After SS-14 drive, added one gallon of water to help with cutting removal.			
	886			9				
	885			11				
24	886	SS-14	2.0	13	At 28.7' large gravel or small cobble fragment. Sandy silt parting on top of clast (damp to dry).			
	885			16				
	884			6				
25	885	SS-15	1.8	9	Below 29.0' trace silt partings or platy texture. Moisture content dropped slightly, damp. Slightly harder (very hard). Platy nature may be due to lower moisture content. No apparent change in composition.			
	884			9				
	883			10				
26	884	SS-16	2.0	10	31.4' - 31.6' cobble (limestone) along half of sample recovery. Reason for high blows.			
	883			7				
	882			13				
27	883	SS-17	2.0	20	Below 34.5' moisture content increased very slightly (damp). Still very hard, but slightly softer. Slight color change (10YR 5/1 to 4/1) slightly stronger gray color hue. No apparent compositional change. Unsorted massive appearance.		Continues to have moderate plasticity. Low to medium toughness and high dry strength. Very hard. Strong reaction with HCl.	
	882			12				
	881			24				
28	882	SS-18	2.0	64	At 38.0' after SS-20 drive, added 10 gal of water to help feed cuttings.			
	881			35				
	880			14				
29	881	SS-19	2.0	18	End 7/30/12, 1730 at 44.0'. Borehole continues to be dry. Begin 7/31, 0730, 70°F, sunny. Borehole is dry, mud on drill rods.			
	880			24				
	879			25				
30	880	SS-20	2.0	9				
	879			12				
	878			15				
31	879	SS-21	2.0	7				
	878			9				
	877			10				
32	878	SS-22	2.0	15				
	877			12				
	876			10				
33	877	SS-23	2.0	15				
	876			8				
	875			10				
34	876			18				
	875			20				
	874			20				
35	875			14				
	874			10				
	873			14				
36	874			8				
	873			10				
	872			10				
37	873			15				
	872			7				
	871			7				
38	872			10				
	871			12				
	870			13				
39	871			7				
	870			9				
	869			10				
40	870			15				
	869			15				
	868			15				
41	869			8				
	868			10				
	867			18				
42	868			20				
	867			10				
	866			14				
43	867			10				
	866			10				
	865			14				
44	866			10				
	865			10				
	864			14				

CECOS, Aber Road Facility Williamsburg, Ohio					BOREHOLE LOG		Boring Number MP-404		
Remarks: Installed at staked location, 15' west-northwest of 12-5A, approximately 14' off access road.									
Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS	
46	865	SS-23	2.0	18 30	Gray to dark gray (10YR 5/1 to 4/1) CLAYEY SANDY SILT. TILL. (Continued).		No indication of water in borehole on SS-23 spoon/rods. Strong reaction with HCl.	CL ML	
	864			10					
47	863	SS-24	2.0	18 20 36	Very consistent hard till. No indication of fractures or weathering.				
	862			9					
49	861	SS-25	2.0	18 22 16			After driving SS-26, added 2 gal of water.		
	860			8					
51	859	SS-26	2.0	13 21 30					
	858			8	Continues to be 10YR 5/1 to 4/1. Medium plasticity. Low to medium toughness. High dry strength. Very consistent appearance and composition.				
53	857	SS-27	2.0	15 18 20					
	856			10					
55	855	SS-28	2.0	20 28 24					
	854			14					
57	853	SS-29	2.0	18 24 25					
	852			12					
59	851	SS-30	2.0	16 21 25			After driving SS-30, added 3 gal of water.		
	850			7	Below 60.0' clay content increased slightly. Medium to high plasticity. Medium toughness. High dry strength.				
61	849	SS-31	2.0	12 16 18					
	848			11	Below 62.0' gradually picks up darker gray color hue (closer to 10YR 4/1). No apparent compositional change. Darker color appears to be due to incorporation of organic material. Examination of plug return indicated the presence of plant material (highly decomposed). Change at 63.5'.		SS-32 drive, near refusal at 64.0'. Strong reaction with HCl.		
63	847	SS-32	2.0	12 12 80					
	846			16	Gray to dark gray (10YR 5/1 to 4/1) SILTY SAND with GRAVEL. Trace to no clay. Unsorted, has till appearance. Very dense. Does not appear wet. Moist to damp. Trace brown to yellowish brown weathered clasts. Overall unweathered. Change at 64.1'.		After augering SS-32, auger plug appeared to be dry. Possibly sandy silt classification.	SM M CL	
65	845	SS-33	1.6	52 43 35	Olive gray to dark olive gray (5Y 4/2 to 3/2) CLAYEY SANDY SILT. Little fine to coarse sand. Trace gravel, up to 2" diameter. Sand and gravel typically are subrounded to angular. Larger clasts are usually fossiliferous limestone. Unsorted, massive appearance. Indurated, very hard. Damp to moist. Medium to high plasticity. Medium toughness. High dry strength. Weathered. Not leached. TILL.				Possible CL-ML classification. No desiccation cracks observed. Strong reaction with acid. Driller noted cobbles while augering (probable reason for recovery loss) SS-34. Added 5 gal of water.
	66	844					12		
67		843	SS-34	1.5	45 38 50		Below 66.5' starting to pick up light olive brown/olive brown (2.5Y 5/3 to 4/3) mottling. Trace mottling below 68.0'. 68.1' - 68.5' ~80° desiccation crack, iron oxide on face (dark reddish brown). 68.7' - 68.9' possible root trace with zones of gray reduction. Continues to have strong reaction with acid.	No indication of water in SS-35 sample. After augering SS-35 borehole appears to be making water. Plug from SS-35 interval had water on the drill rods, first plug ran with water.	
	68	842			11				
69		841	SS-35	2.0	28 38 53				

CECOS, Aber Road Facility Williamsburg, Ohio					BOREHOLE LOG		Boring Number MP-404	
Remarks: Installed at staked location, 15' west-northwest of 12-5A, approximately 14' off access road.								
Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
71	840	SS-36	2.0	12	Olive gray to dark olive gray (5Y 4/2 to 3/2) and olive brown to dark olive brown (2.5Y 4/3 to 5/3) CLAYEY SANDY SILT. TILL. (Continued).		Strong reaction with acid.	CL
	839			15	Below 70.2' primarily greenish gray to dark greenish gray (10Y 5/1 to 4/1). Slightly weathered to unweathered. Medium plasticity. Medium to low toughness. High dry strength. Probable slight decrease in clay content. Consistently moist. SS-37 large gravel impression in sampler tip. Probably blocked recovery. Plug recovery for SS-37 auger interval was till, no indication of sand/sand and gravel formation.			
72	838			20	Below 72.8' becomes unweathered. Consistent greenish gray to dark greenish gray color.			
73	837	SS-37	0.85	22	At 74.4' greenish gray silt parting, ~15° angle. Moist.		End 7/31/12, 1530 at 72' for rig repairs. Didn't auger SS-36. Begin 8/1/12, 0730. Make rig repairs. WL = 32.06 from gravel at 0801. Water probably entering borehole from 68'-70' interval. Start drilling at 0805. Strong reaction with acid.	
74	836			8				
75	835			19				
76	834	SS-38	2.0	25	Below 75.7' gravel content decreased slightly, still trace. Softer, stiff to hard. Consistent, unsorted, massive appearance.			
77	833			6	At 76.5' and 76.9' small wood fragments (~1/8" diameter) incorporated in unit. Brown color. No bark, appears to be a splinter fragment.			
78	832			22				
79	831	SS-40	2.0	17	At 79.25' 1/8" wood fragment, very decomposed (black in part).		Majority of clasts are limestone or shale. High percentage of shale incorporated in the unit, probably providing color hue of unit.	
80	830			6	At 79.3' large broken gravel fragment.			
81	829			8				
82	828	SS-41	2.0	11	At 82.8' brown, 1/8" - 1/4" wood fragment. No bark. Broken fragment.		Strong reaction with acid.	
83	827			11	82.95' - 83.05' dark greenish gray fine to medium sand seam. Trace fine gravel. Few silt. Poorly sorted. Wet. Trace black organic material. well graded. SM-SW.			
84	826			5				
85	825	SS-43	2.0	5	84.35' - 84.5' greenish gray to gray fine sand incorporated in till unit, (deformed) or a pod. Damp to moist. SM.		Borehole continues to have water, becoming very muddy.	
86	824			6	At 85.3' fine greenish gray to gray silt, fine silty sand parting, moist to damp.			
87	823			16				
88	822	SS-44	2.0	12	Change at 87.8'.		Underlying contact appears relatively sharp with transition across less than 0.05'.	
89	821			5	Greenish gray to dark greenish gray (10Y 5/1 to 4/1) SILT. Few to trace clay. Trace black organic material, usually occurs as partings or along thin seams (<1/2 inch). Few to little fine to very fine sand. Deformed to thinly bedded/weathered appearance. Moist. Unweathered. Cohesive, holds split-spoon form. Low to medium plasticity. Low toughness. LACUSTRINE.			
90	820			6	Below 89.6' thinly bedded to laminated appearance. Beds/laminations are apparent horizontal to ~5°.			
91	819	SS-46	2.0	7	Change at 91.0'.		Strong reaction with acid. No dilatancy. At 89.8' possible white gastropod shell fragment (~1mm). Added 10 gal water prior to augering SS-45 interval to thin mud in augers. Underlying contact is sharp and apparent horizontal.	ML
92	818			7	Dark greenish gray to very dark greenish gray (10GY 4/1 to 3/1) CLAY. Trace to little silt (hard to estimate). High plasticity, toughness, and dry strength. No dilatancy. Hard. Damp to moist. Structureless to deformed. Laminated in part. Unweathered. LACUSTRINE. Change at 92.1'.			
93	817			9	Dark greenish gray to very dark greenish gray (5G 4/1 to 3/1) CLAY. Little silt. Trace to few sand. Trace fine gravel. Trace black organic inclusions (<1mm). Unsorted. Gravel content increasing with depth. Moist to damp. High plasticity, toughness, and dry strength. Weathered, leached. Probable SUBSOIL.			
94	816	SS-47	1.9	11	Below 93.8' becomes primarily composed of fine shale fragments. Trace yellowish brown weathered inclusions (<2mm). Cohesive.		No reaction with acid. Higher silt content than above. Most clasts are highly weathered.	CL
				3				
				4				
		SS-48	1.7	6			No reaction with acid, leached.	
				7				
				10				
				20				

BOREHOLE LOG V2 - ELEVATION CECOS.GPJ EAGON.GDT 10/8/12

CECOS, Aber Road Facility Williamsburg, Ohio					BOREHOLE LOG		Boring Number MP-404				
Remarks: Installed at staked location, 15' west-northwest of 12-5A, approximately 14' off access road.											
Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS			
96	815	SS-48	1.7	22 28	high plasticity. Possible fine gypsum crystals in matrix (<1mm). Moist to damp. Change at 95.0'.		Strong reaction with acid. 96.0' - 96.1' and 98.0' - 98.1' limestone seam. Cut firm and steady, limestone seams are very hard.				
	814	SS-50	0.0	50/0	Pale olive to light olive (10Y 6/4 to 5/4), light greenish gray to grayish green (5GY 6/2 to 5/2), and greenish gray (10G 6/1 to 5/1) SHALE and bluish gray (10B 6/1 to 5/1) LIMESTONE. Thinly bedded. Weathered. Limestone beds are generally pulverized by sampling method. Shale beds are laminated, soft, and calcareous. Trace marine fossils/fossil fragments.						
97	813	NS									
98	812										
99	811				Bottom of borehole = 99.0'.		Added a total of 30 gal water while drilling.				
100	810				96.0' - 99.0' augered without sampling. Cut very hard, limestone seams at 96' and 98'. Augered with split spoon inside augers. Recovered gray, unweathered limestone and shale cuttings.						
101	809				1615 augered to 99.0', near refusal. Cleaned out augers with auger plug. Borehole open to augers.						
102	808				8/1/12, 1655, finish for day, 90°F, sunny.						
103	807				8/2/12, 0730, 70°F, sunny. Augers/borehole are very muddy. Could not measure water level. Pulled augers back ~9' prior to cleaning borehole.						
104	806				0802 - 0957 developed/cleaned borehole using a steel dart bailer (4.0 gal capacity). Added a total of 190 gallons of water to facilitate cleaning/development. Removed a total of 300 gallons water bailing. Returns were fairly clean by the end of bailing and free of heavy sediment and the borehole was making water.						
105	805				Installed Monitoring Well MP-404 in borehole. See Monitoring Well Installation Report MP-404 for details.						
106	804										
107	803										
108	802										
109	801										
110	800										
111	799										
112	798										
113	797										
114	796										
115	795										
116	794										
117	793										
118	792										
119	791										

Monitoring Well Installation Report

Site Name and Location: CECOS, Aber Road Facility, Williamsburg, Ohio

Completion Date: 8/2/12

Coordinates: 5231.98N 8108.08E

Borehole Depth (ft): 99.0

Elevation Top of Casing (ft/MSL): 912.75

Borehole Diameter (in): 8"

Elevation Ground Surface (ft/MSL): 910.2

Drilling Methods: 4 1/4" ID Hollow Stem Auger

Installed By: Mike Caprioni/Jersey West Drilling, Inc.

Completed Drilling: 8/1/12

Supervised By: David Sugar/Eagon & Associates, Inc.

Drilling Water Used (gals): 30

Well Design

Component	Materials	Depth (LSD)	Elevation
Well Protector	4" Diameter Steel with Locking Lid	-2.8 - 2.2	913.0 - 908.0
Riser	2" Diameter Schedule 40 PVC	-2.6 - 93.2	912.8 - 817.0
Surface Seal	24" Diameter Concrete	-0.9 - 2.5	911.1 - 907.7
Grout Seal	"Pure Gold" Bentonite Grout	2.5 - 88.5	907.7 - 821.7
Bentonite Seal	3/8" Bentonite Chips	88.5 - 91.0	821.7 - 819.2
Sand Pack	No. 5 "Global" Silica Sand	91.0 - 98.4	819.2 - 811.8
Screen	2" Diameter 10-Slot Schedule 40 PVC	93.2 - 97.9	817.0 - 812.3
Well Point Blank	2" Diameter Schedule 40 PVC Cap	97.9 - 98.4	812.3 - 811.8
Sand Pack Bottom	No. 5 "Global" Silica Sand	98.4 - 99.0	811.8 - 811.2

Well Development

Well Depth (ft, TOC):

101.0

Depth to Water (ft, TOC):

17.52

Well Volume (gals):

13.6

Volume Purged (gals):

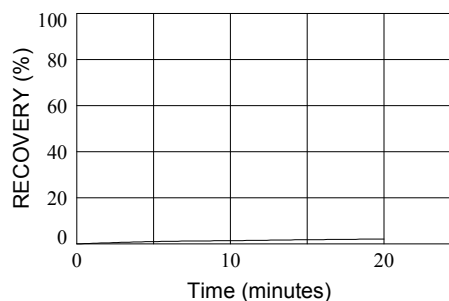
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Development Method:

Surge block, bailer, bladder pump

Date	Time	Cumulative Volume Removed (gals)	Temp (°C)	Specific Conductivity (µmhos/cm)	pH (S.U.)	Turbidity (NTU)
8/9/12	1302	2.60	16.1	1207	7.94	>1000
8/14/12	1717	29.15	20.8	1477	7.42	385.0
8/16/12	1020	41.63	14.6	1465	8.07	330.0
8/17/12	1324	54.63	15.1	1418	6.62	38.2
8/28/12	1033	93.63	-	-	-	4.1
8/31/12	1345	76.33	-	-	-	113.0

Recovery Data



Sampling Equipment:

Bladder pump

Comments:

Well riser and screen are "Johnson" flush threaded sections with O-ring seals. Bentonite grout mixed to 30% specifications.

Boring depth=99.0 ft.

BOREHOLE LOG

Site Name and Location: CECOS, Aber Road Facility Williamsburg, Ohio		Drilling Methods: 4 1/4" ID Hollow Stem Auger			Boring Number: MP-404A	
Drilling Firm: <i>Jersey West Drilling</i>		DATE	TIME	DEPTH DRILLED (ft)	WATER LEVEL (ft)	
Driller / Rig: <i>Mike Caproni/Acker Soil Max</i>						Page 1 of 1
Logged by: <i>David Sugar</i>		Sampling Methods:				Start
Coordinates: <i>5289.24N 7880.46E</i>		ST = Shelby Tube WS = Waxed Sample SP = Sand Pump DP = Direct Push CT = Cuttings				Finish
Surface Elevation: <i>912.6 ft/MSL</i>		SS = Split Spoon CS = Continuous Sampler C = Coring NS = Not Sampled B = Bailer				Time 1353
Surface Conditions / Weather: <i>Dry, grass covered, relatively flat /85°-87° F, Sunny</i>						Date 8/6/12

Remarks: Located approximately 5' north of 12-6.

Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or FQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
1	912	SS-1	1.45	1	Grayish brown to yellowish brown / dark yellowish brown (10 YR 5/2 to 5/4) and (10 YR 4/2 to 4/4) CLAYEY SANDY SILT. Trace fine gravel. Trace roots. Clasts are generally subangular to subrounded. Medium plasticity and toughness. High dry strength. Moist to damp. Probable SOIL FILL.		Continuous 2" OD, 2' drive split spoon sampling. Driven with 300 lb. manual hammer.	ML CL
2	911			4				
3	910	SS-2	2.0	8	1.2' - 5.2' Greenish gray siltstone/clayey siltstone boulder. Appears to be laying horizontal. Soft, but not highly weathered.		Variable reaction with HCl.	
4	909			17				
5	908	SS-3	1.6	24				
6	907			27				
7	906	SS-4	1.6	12	Below 5.2' in part clayey silt/silty clay. Weak layered to mottled appearance. Becomes moist.		CL in part.	
8	905			14			No to very slight reaction with HCl.	
9	904	SS-5	1.6	12	Change at 8.3'. Gray, grayish brown, and light olive brown (2.5 Y 5/1 to 5/4) and light yellowish brown to olive yellow (2.5 Y 6/4 to 5/6) CLAYEY SILT to SILTY CLAY. Few to little sand. Trace gravel, generally fine subrounded to angular. Most clasts are very weathered. Medium stiff. High plasticity, toughness, and dry strength. Weak layered to mottled appearance. Unsorted. SUBSOIL.		Underlying contact may be as high as 7.0'. Top of SS-5 recovery may not be in place.	
10	903			2				
11	902	SS-6	1.7	3				
12	901			4	Possibly could classify as highly weathered till. Change at 12.2'.		Possibly CH in part. No reaction with HCl.	CL
13	900	SS-7	2.0	3	Brown to yellowish brown (10 YR 5/3 to 5/6) and brown to dark yellowish brown (10 YR 4/3 to 4/4) CLAYEY SANDY SILT. Trace gravel, generally less than 1". Clasts are typically subrounded to angular with some highly weathered. Hard to very hard. Medium plasticity and toughness. High dry strength. Moist to damp. Weathered. Unsorted. Massive to weak platy appearance. TILL. Change at 14.0'.		Strong reaction with HCl.	ML CL
14	899			4				
15	898	SS-8	2.0	9	Brown to yellowish brown (10 YR 5/3 to 5/6) SANDY SILT. Trace to no clay. Trace gravel, generally less than 1/2" diameter. Very hard. Holds split spoon form. Nonplastic to slightly plastic. Damp to moist. Weathered. Unsorted. Massive appearance. Change at 15.6'.		Trace fine sand partings near horizontal to 50° angle. May classify as SM in part. Strong reaction with HCl.	ML
16	897			11				
17	896	SS-9	2.0	21	Gray to grayish brown (10 YR 5/1 to 4/1, and 5/2) CLAYEY SANDY SILT. Trace gravel up to 1" diameter. Clasts are typically subrounded to angular. Unsorted, massive to weak layered appearance. Very hard. Medium plasticity and toughness. High dry strength. Damp. Unweathered to weathered. TILL.		Overlying contact is at ~50° angle, with sand partings. Dry. Trace oxidized desiccation cracks. Transitioning to unweathered till.	ML CL
18	895			10				
19	894			12	Bottom of Borehole = 18.0'.			
20	893			14	Monitoring Well MP-404A installed in borehole. See Monitoring Well Installation Report MP-404A for details.			

Monitoring Well Installation Report

Site Name and Location: *CECOS, Aber Road Facility, Williamsburg, Ohio* Completion Date: *8/8/12*

Coordinates: *5289.24N 7880.46E*

Borehole Depth (ft): *18.0*

Elevation Top of Casing (ft/MSL): *915.09*

Borehole Diameter (in): *8 1/4"*

Elevation Ground Surface (ft/MSL): *912.6*

Drilling Methods: *4 1/4" ID Hollow Stem Auger*

Installed By: *Mike Caprioni/Jersey West Drilling, Inc.*

Completed Drilling: *8/6/12*

Supervised By: *David Sugar/Eagon & Associates, Inc.*

Drilling Water Used (gals): *None*

Well Design

Component	Materials	Depth (LSD)	Elevation
Well Protector	4" Diameter Steel with Locking Lid	-2.6 - 2.4	915.2 - 910.2
Riser	2" Diameter Schedule 40 PVC	-2.5 - 12.7	915.1 - 899.9
Surface Seal	24" Diameter Concrete	-0.6 - 2.5	913.2 - 910.1
Grout Seal	"Pure Gold" Bentonite Grout	2.5 - 9.5	910.1 - 903.1
Bentonite Seal	3/8" Bentonite Chips	9.5 - 11.6	903.1 - 901.0
Sand Pack	No. 5 "Global" Silica Sand	11.6 - 17.9	901.0 - 894.7
Screen	2" Diameter Schedule 40 PVC 10-slot	12.7 - 17.5	899.9 - 895.1
Well Point Blank	2" Diameter Schedule 40 PVC Cap	17.5 - 17.9	895.1 - 894.7
Sand Pack Bottom	No. 5 "Global" Silica Sand	17.9 - 18.0	894.7 - 894.6

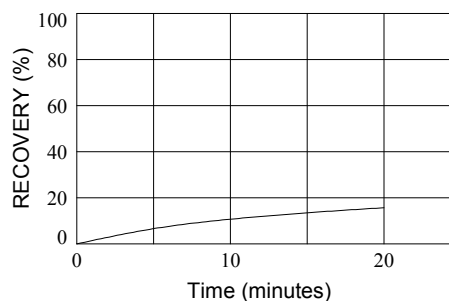
Well Development

Well Depth (ft, TOC): *20.4* Depth to Water (ft, TOC): *8.31* Well Volume (gals): *2.0* Volume Purged (gals): *27.4*

Development Method:
Surge block, bailer, bladder pump

Date	Time	Cumulative Volume Removed (gals)	Temp (°C)	Specific Conductivity (µmhos/cm)	pH (S.U.)	Turbidity (NTU)
8/10/12	1010	6.50	15.3	948	7.14	>1000
8/16/12	1730	20.50	16.1	1013	7.54	104.0
8/17/12	0808	23.00	17.5	993	7.78	148.0
8/17/12	0818	23.26	17.4	982	7.61	106.0
8/17/12	0822	23.39	17.4	971	7.52	69.8
8/23/12	1135	23.39	-	-	-	13.2

Recovery Data



Sampling Equipment:

Bladder pump

Comments:

Well riser and screen are "Johnson" flush threaded sections with o-ring seals. Bentonite grout mixed to 30% specifications.

Boring depth=18.0 ft.

BOREHOLE LOG

Site Name and Location: CECOS, Aber Road Facility Williamsburg, Ohio		Drilling Methods: 4 1/4" ID Hollow Stem Auger		Boring Number: MP-405A	
Drilling Firm: <i>Jersey West Drilling</i>		DATE	TIME	DEPTH DRILLED (ft)	WATER LEVEL (ft)
Driller / Rig: <i>Danny Caproni/CME-550</i>					
Logged by: <i>David Sugar</i>		<u>Sampling Methods:</u> ST = Shelby Tube SS = Split Spoon WS = Waxed Sample CS = Continuous Sampler SP = Sand Pump C = Coring DP = Direct Push NS = Not Sampled CT = Cuttings B = Bailer			
Coordinates: <i>5420.39N 8336.47E</i>		Start Finish Time Time 1535 1710			
Surface Elevation: <i>908.5 ft/MSL</i>		Date Date 8/8/12 8/8/12			
Surface Conditions / Weather: <i>Grass covered, moderate slope, dry /95° F, Sunny</i>					

Remarks: Installed at staked location on edge of access road.

Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
1	908	SS-1	0.0	4	Probable road bed and soil fill.		Continuous 2" OD, 2' drive split spoon sampling driven with 300 lb. manual hammer. 8 1/4" borehole. Ran auger center bit while augering.	
2	907			3				
3	906	SS-2	0.0	2			Underlying contact may be as high as 0.5'.	
4	905			2	Change at 4.0'.			
5	904	SS-3	1.45	2	Gray/grayish brown (10 YR 5/1 to 5/2) to gray/light olive brown (2.5 Y 5/1 to 5/4) SILTY CLAY. Trace to few sand. Trace gravel, generally less than 1/2" diameter, angular to subrounded. Unsorted, mottled appearance. High plasticity, toughness, and dry strength. Moist. Medium stiff. Weathered. SUBSOIL.		No reaction with HCl. Trace roots with associated gray reduction. SS-4 Run no indication of water.	CL
6	903			3				
7	902	SS-4	1.25	2	Below 6.2' primarily yellowish brown (10 YR 5/4 to 5/6). Picking up till appearance. Highly weathered. Leached.		Clasts are generally very weathered to totally weathered.	
8	901			3			Underlying contact may be as high as 7.3'.	
9	900	SS-5	1.5	4	Change at 8.0'.			
10	899			7	Brown to yellowish brown/dark yellowish brown (10 YR 5/3, 5/4, 4/3, and 4/4) CLAYEY SANDY SILT. Trace gravel up to 1" diameter, angular to subrounded. Unsorted, massive to mottled appearance. Hard to very hard. Medium plasticity, toughness. High dry strength. Moist to damp. Weathered. TILL.		Strong reaction with HCl. SS-5 Spoon was wet.	ML CL
11	898	SS-6	1.3	12	8.0' - 8.1' Gravelly/sandy zone. Moist.			
12	897			19	8.25' - 8.30' brown, medium to coarse sand seam/parting. Trace gravel. Few silt. Wet.			
13	896	SS-7	2.0	26	8.50' - 8.55' brown, medium to coarse sand seam/parting. Trace gravel. Few silt. Wet.			
14	895			41	Below 9.1' color changing to grayish brown/brown (10 YR 5/2 to 5/3).			
15	894			51	Below 10.8' becomes layered with gray/dark gray (10 YR 5/1 to 4/1) and grayish brown zones. Gray/dark gray color increasing with depth.		12.2'-12.5' Near vertical desiccation cracks with iron oxide precipitate on face. No indication of water. Below 12.6' predominantly unweathered. Gray/dark gray color.	
16	893			115	From 13.5' - 13.8' Light olive brown (2.5 Y 5/3 to 5/4) SANDY SILT with gravel. Trace clay. Sandy till does not appear fluvial. Very dense. Damp. Strong reaction with HCl.			
17	892				Bottom of Borehole = 14.0'.			
18	891				Monitoring Well MP-405A installed in borehole. See Monitoring Well Installation Report MP-405A for details.			
19	890							
20	889							

Monitoring Well Installation Report

Site Name and Location: CECOS, Aber Road Facility, Williamsburg, Ohio

Completion Date: 8/8/12

Coordinates: 5420.39N 8336.47E

Borehole Depth (ft): 14.0

Elevation Top of Casing (ft/MSL): 911.02

Borehole Diameter (in): 8 1/4"

Elevation Ground Surface (ft/MSL): 908.5

Drilling Methods: 4 1/4" ID Hollow Stem Auger

Installed By: Danny Caprioni/Jersey West Drilling

Completed Drilling: 8/8/12

Supervised By: David Sugar/Eagon & Associates, Inc.

Drilling Water Used (gals): None

Well Design

Component	Materials	Depth (LSD)	Elevation
Well Protector	4" Diameter Steel with Locking Lid	-2.7 - 2.3	911.2 - 906.2
Riser	2" Diameter Schedule 40 PVC	-2.5 - 8.0	911.0 - 900.5
Surface Seal	24" Diameter Concrete	-0.9 - 2.5	909.4 - 906.0
Bentonite Seal	3/8" Bentonite Chips	2.5 - 7.0	906.0 - 901.5
Sand Pack	No. 5 "Global" Silica Sand	7.0 - 13.2	901.5 - 895.3
Screen	2" Diameter 10-Slot Schedule 40 PVC	8.0 - 12.8	900.5 - 895.7
Well Point Blank	2" Diameter Schedule 40 PVC Cap	12.8 - 13.2	895.7 - 895.3
Sand Pack Bottom	No. 5 "Global" Silica Sand	13.2 - 14.0	895.3 - 894.5

Well Development

Well Depth (ft, TOC):

15.6

Depth to Water (ft, TOC):

8.37

Well Volume (gals):

1.2

Volume Purged (gals):

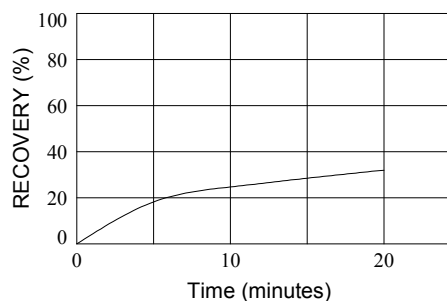
36.1

Development Method:

Surge block, bailer, bladder pump

Date	Time	Cumulative Volume Removed (gals)	Temp (°C)	Specific Conductivity (µmhos/cm)	pH (S.U.)	Turbidity (NTU)
8/10/12	0916	5.00	-	-	-	>1000
8/16/12	1750	26.00	17.3	3080	7.11	18.3
8/17/12	0951	29.75	17.9	3170	7.28	209.0
8/17/12	1006	30.14	17.4	3170	7.12	81.0
8/17/12	1026	30.66	17.6	3160	7.11	40.0
8/17/12	1304	31.57	-	-	-	5.3

Recovery Data



Sampling Equipment:

Bladder pump

Comments:

Well riser and screen are "Johnson" flush threaded sections with o-ring seals. Bentonite grout mixed to 30% specifications.

Boring depth=14.0 ft.

BOREHOLE LOG

Site Name and Location: CECOS, Aber Road Facility Williamsburg, Ohio		Drilling Methods: 4 1/4" ID Hollow Stem Auger			Boring Number: MP-406C	
Drilling Firm: <i>Jersey West Drilling</i>		DATE	TIME	DEPTH DRILLED (ft)	WATER LEVEL (ft)	
Driller / Rig: <i>Mike Caproni/Acker Soil Max</i>						Page 1 of 3
Logged by: <i>David Sugar/Shay Beanland</i>		Sampling Methods:				Start
Coordinates: <i>5412.90N 7571.33E</i>		ST = Shelby Tube WS = Waxed Sample SP = Sand Pump DP = Direct Push CT = Cuttings				Finish
Surface Elevation: <i>914.9 ft/MSL</i>		SS = Split Spoon CS = Continuous Sampler C = Coring NS = Not Sampled B = Bailer				Time 0912
Surface Conditions / Weather: <i>Dry, flat, adjacent to access road / 75°-90°F, Sunny</i>						Date 8/7/12

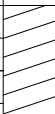

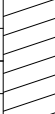





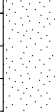

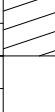
Remarks: Installed at staked location.

Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
1	914	SS-1	0.8	2	Grayish brown to yellowish brown / dark yellowish brown (10 YR 4/2 to 4/4) SILTY CLAY to CLAYEY SILT. In part, sandy silt. Few sand. Trace gravel, generally less than 1/2" diameter, subrounded to angular. Unsorted, weak layered to deformed appearance. Medium to high plasticity and toughness. High dry strength. Moist. Weathered. SOIL FILL (recompacted till).		Continuous 2" OD, 2' drive split spoon sampling, 300 lb. manual hammer. 8" diameter borehole. Ran 4" steel center plug while augering. Logged by DJS.	CL
2	913			3				
3	912	SS-2	1.5	3				
4	911			5				
5	910	SS-3	2.0	1	ML-CL and possibly CH classification in part. Slight to strong reaction with HCl.			
6	909			2				
7	908	SS-4	1.4	2				
8	907			3				
9	906	SS-5	1.5	1	Gray/grayish brown to yellowish brown (10 YR 6/1 to 6/6 and 5/1 to 5/4) SILTY CLAY to CLAYEY SILT. Few to little sand. Trace gravel, generally less than 1/2" diameter, increases with depth. Most clasts are highly weathered to completely weathered. Weak layered to mottled appearance. High plasticity, toughness, and dry strength. Medium stiff. Moist. SUBSOIL.		No reaction with HCl.	CL
10	905			2				
11	904	SS-6	1.6	2				
12	903			2				
13	902	SS-7	1.75	1	Brown to yellowish brown (10 YR 5/3 to 5/6) CLAYEY SANDY SILT. Trace gravel up to 1" diameter, angular to subrounded. Unsorted, massive to platy appearance. Very hard. Medium plasticity and toughness. High dry strength. Moist to damp. Weathered. TILL.		Strong reaction with HCl. Trace cobbles. Platy texture may be due to sampling method and hardness.	ML CL
14	901			9				
15	900	SS-8	1.75	14				
16	899			35				
17	898	SS-9	1.75	18	Below 16.0' color changes to predominantly dark gray to grayish brown/dark grayish brown (10 YR 5/1, 5/2, 4/1, 4/2). Becomes damp. Continues to be very hard.		16.0'-18.3' Desiccation cracks become prominent, oxidized yellowish brown. Typically horizontal, up to 45° angle with iron oxide precipitate. No indication of water.	
18	897			29				
19	896	SS-10	1.75	13				
				17				
				24	Below 18.3' becomes consistent gray/dark grayish brown to dark gray/light grayish brown. Unweathered.		No desiccation cracks observed below 18.3'.	

Eagon & Associates, Inc.

CECOS, Aber Road Facility Williamsburg, Ohio					BOREHOLE LOG		Boring Number MP-406C		
Remarks: Installed at staked location.									
Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS	
21	894	SS-11	1.9	8 14 16 17	Gray/grayish brown to dark gray/dark grayish brown CLAYEY SANDY SILT. TILL (cont'd).		Continues to be unweathered. Very hard. Damp.	ML CL	
22	893	SS-12	2.0	7 9 11 15	Below 27.5' slight color change, picking up stronger grayish brown/dark grayish brown color hue.		No indication of water. Borehole is dry. Massive, very consistent appearance.		
23	892								
24	891								
25	890	SS-13	2.0	5 7 8 9			At 26.0' added 3 gallons water to facilitate cutting removal.		
26	889								
27	888								
28	887	SS-14	2.0	6 8 8 10					Till continues to have very consistent composition and appearance. No indication of water. Strong reaction with HCl.
29	886								
30	885								
31	884	SS-15	2.0	5 11 21 29					
32	883								
33	882								
34	881	SS-16	2.0	17 26 6 11	From 30.95' - 31.05' medium to coarse sand inclusion or pod, appears deformed with or mixed with till. Moist.				
35	880								
36	879								
37	878	SS-17	1.9	3 8 11 20			Change at 32.3'. Gray to grayish brown (10 YR 5/1 to 5/2) medium to coarse SAND. Trace to few gravel up to 1" diameter (generally less than 1/2"), generally subrounded to rounded. Well graded. Dense. Trace silt. Wet. Relatively high percentage of black shale sand and gravel.		
38	877								
39	876								
40	875	SS-18	1.7	13 14 16 18				Below 33.7' gravel content decreases, still trace. Below 34.2 few silt.	
41	874								
42	873								
43	872	SS-19	2.0	11 12 13 14					Below 36.5'. Gray to dark gray (10 YR 5/1 to 4/1) CLAYEY SANDY SILT. Trace gravel, generally less than 1/2" diameter, angular to subrounded. Unsorted, massive appearance. Very hard. Medium plasticity and toughness. High dry strength. Damp to moist. Unweathered. TILL.
44	871								
		SS-20	2.0	7 14 15 15	Overlying contact is sharp. Apparent horizontal.				
		SS-21	1.8	9 13 15 16		Very consistent appearance. Strong reaction with HCl.			
		SS-22	2.0	7 14 15 16			Added 5 gallons of water to facilitate cutting removal.		
		SS-23	2.0	7 9					

BOREHOLE LOG V2 - ELEVATION CECOS.GPJ EAGON.GDT 10/8/12

CECOS, Aber Road Facility Williamsburg, Ohio					BOREHOLE LOG		Boring Number MP-406C	
Remarks: Installed at staked location.								
Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
46	869	SS-23	2.0	12	Gray to dark gray (10 YR 5/1 to 4/1) CLAYEY SANDY SILT. TILL (cont'd).		Continues to be unweathered. Very hard. Damp to dry. No indication of water production. End 8/7 17:24 at 48.0'. Start 8/8 at 07:40. Logged by SB.	ML CL
				13				
47	868	SS-24	2.0	5				
				7				
48	867			9				
				11				
49	866	SS-25	2.0	7				
				10				
50	865			10				
				12				
51	864	SS-26	2.0	6	Below 50.0' material has a stronger gray hue but still (10 YR 5/1 to 4/1).		Added ~5 gallons of water to clean augers.	
				7				
52	863			8				
				9				
53	862	SS-27	2.0	7				
				8				
54	861			11	From 54.15' - 54.4' sand content increasing. Clay content decreases to trace. Becomes silty sand to sandy silt. Trace clay. Cohesive. Fine grained. Trace medium to coarse grained sand. Poorly graded. Moist. SM-ML classification.			
				14				
55	860	SS-28	1.5	5	From 56.0' - 56.3' SANDY SILT seam. Trace clay. Cohesive. No plasticity and toughness. Moist.			
				9				
56	859			9				
				8				
57	858	SS-29	1.6	6	Change at 56.3'		Predominantly fine grained sand. Trace medium to coarse grained sand. Well sorted.	ML SW SM
				8				
58	857			13	Gray to dark gray (10 YR 5/1 to 4/1) SILT. No sand. No gravel. Cohesive. Low plasticity and toughness. Rapid dilatancy. Wet. Change at 56.5'.			
				15				
59	856	SS-30	1.4	7	Gray to dark gray (10 YR 5/1 to 4/1) SAND. Little to some gravel. Medium to coarse sand. Small to large gravel, subangular to rounded, up to 1 1/2" diameter. Well graded. Dense. Wet. Few to some silt.			
				10				
60	855			11				
				11				
61	854	SS-31	1.6	10	Upper 0.9' trace gravel, predominantly fine to coarse sand.			
				12				
62	853			11				
				9				
63	852	SS-32	1.35	12				
				17				
64	851			17	Below 63.0' silt content increasing to few.		At 63.5' driller notes possible cobbles. Augering rough.	
				13				
65	850	SS-33	1.8	18				
				24				
66	849			16				
				6				
67	848	SS-34	1.8	34	Change at 67.1'.			
				20				
68	847			32	Gray to dark gray (10 YR 5/1 to 4/1) CLAYEY SANDY SILT. Trace gravel, angular to subrounded, up to 3/4" diameter. Unsorted. Massive. Very hard. Medium plasticity and toughness. Unweathered. Moist.		Bailed 26 bailers of water (~104 gallons) out of borehole. Flushed borehole with 150 gallons of water to remove heave.	ML CL
69	846				Bottom of Borehole = 68.0'. Set MP-406C in borehole. Drove split spoon to 68.0' but only augered to 66.0'.			

BOREHOLE LOG V2 - ELEVATION CECOS.GPJ EAGON.GDT 10/8/12

Monitoring Well Installation Report

Site Name and Location: *CECOS, Aber Road Facility, Williamsburg, Ohio* Completion Date: *8/8/12*

Coordinates: <i>5412.90N 7571.33E</i>	Borehole Depth (ft): <i>68.0</i>
Elevation Top of Casing (ft/MSL): <i>917.40</i>	Borehole Diameter (in): <i>8 1/2"</i>
Elevation Ground Surface (ft/MSL): <i>914.9</i>	Drilling Methods: <i>4 1/4" ID Hollow Stem Auger</i>
Installed By: <i>Mike Caproni/Jersey West Drilling, Inc.</i>	Completed Drilling: <i>8/8/12</i>
Supervised By: <i>Shay Beanland/Eagon & Associates, Inc.</i>	Drilling Water Used (gals): <i>150</i>

Well Design

Component	Materials	Depth (LSD)	Elevation
Well Protector	4" Diameter Steel with Locking Lid	-2.8 - 2.2	917.7 - 912.7
Riser	2" Diameter Schedule 40 PVC	-2.6 - 59.7	917.5 - 855.2
Surface Seal	24" Diameter Concrete	-0.4 - 2.5	915.3 - 912.4
Grout Seal	"Pure Gold" Bentonite Grout	2.5 - 55.2	912.4 - 859.7
Bentonite Seal	3/8" Bentonite Chips	55.2 - 57.3	859.7 - 857.6
Sand Pack	No. 5 "Global" Silica Sand	57.3 - 65.0	857.6 - 849.9
Screen	2" Diameter Schedule 40 PVC 10-slot	59.9 - 64.7	855.0 - 850.2
Well Point Blank	2" Diameter Schedule 40 PVC Cap	64.7 - 65.0	850.2 - 849.9
Sand Pack Bottom	No. 5 "Global " Silica Sand/Formation Sand	65.0 - 68.0	849.9 - 846.9

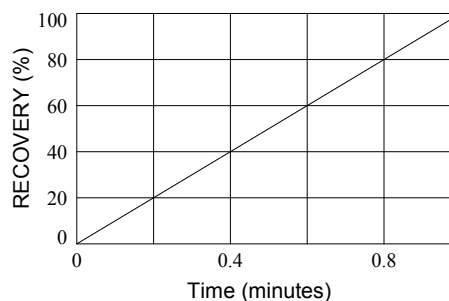
Well Development

Well Depth (ft, TOC): <i>67.6</i>	Depth to Water (ft, TOC): <i>22.24</i>	Well Volume (gals): <i>7.4</i>	Volume Purged (gals): <i>568.5</i>
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Development Method:
Surge block, bailer, grundfos pump

Date	Time	Cumulative Volume Removed (gals)	Temp (°C)	Specific Conductivity (µmhos/cm)	pH (S.U.)	Turbidity (NTU)
8/14/12	1828	1.00	-	-	-	>1000
8/15/12	0823	202.00	14.0	923	7.23	483.0
8/15/12	1248	366.0	14.5	918	7.52	31.6
8/15/12	1409	546.0	14.2	906	7.48	23.2
8/15/12	1510	564.75	15.5	901	7.46	9.6
8/15/12	1515	568.50	15.5	895	7.48	8.9

Recovery Data



Sampling Equipment:

Bladder pump

Comments:

Well riser and screen are "Johnson" flush threaded sections with O-ring seals. Bentonite grout mixed to 30% specifications. From 66.0'-68.0' Natural sand pack.

Boring depth=68.0 ft.

BOREHOLE LOG

Site Name and Location: CECOS, Aber Road Facility Williamsburg, Ohio		Drilling Methods: 4 1/4" ID Hollow Stem Auger				Boring Number: MP-407	
Drilling Firm: <i>Jersey West Drilling</i>		DATE	TIME	DEPTH DRILLED (ft)	WATER LEVEL (ft)		
Driller / Rig: <i>Mike Caproni/Acker Soil Max</i>							
Logged by: <i>Shay Beanland/David Sugar</i>		<u>Sampling Methods:</u> ST = Shelby Tube WS = Waxed Sample SP = Sand Pump DP = Direct Push CT = Cuttings SS = Split Spoon CS = Continuous Sampler C = Coring NS = Not Sampled B = Bailer				<i>Page 1 of 4</i>	
Coordinates: <i>5327.14N 7044.23E</i>						Start	Finish
Surface Elevation: <i>907.8 ft/MSL</i>						<i>Time</i> <i>1010</i>	<i>Time</i> <i>0930</i>
Surface Conditions / Weather: <i>Dry, flat, adjacent to access road / 75-85°F, Sunny</i>						<i>Date</i> <i>8/9/12</i>	<i>Date</i> <i>8/13/12</i>

Remarks: Installed at staked location adjacent to access road.


























Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or FQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
1	907	SS-1	0.4	5	Grayish brown to yellowish brown/dark yellowish brown (10YR 5/2 to 4/4) CLAYEY SILT. Few sand. Trace gravel, up to 1" diameter, subangular to angular. Unsorted. No bedding appearance. Medium plasticity and toughness. Medium dry strength. Weathered. Moist. Trace roots. SOIL FILL.		Continuous 2" OD, 2' drive split-spoon sampling. Rock lodged in bottom of spoon. Strong reaction to acid down to 2.4'. Logged by SB.	CL
2	906			2				
3	905	SS-2	0.7	3	Change at 2.4'.		No reaction to acid.	CL
4	904			2	Gray to yellowish brown (10YR 4/1 to 5/6) SILTY CLAY, CLAYEY SILT in part. Few to little sand, predominately fine to medium grained. Trace gravel, less than 1/4" diameter, subrounded to subangular. Trace organics. Weak layered to mottled appearance. High plasticity and toughness. High dry strength. Medium stiff to stiff. Weathered. Moist. SUBSOIL.			
5	903	SS-3	1.1	1	Change at 6.6'.		8.3' and 8.55' horizontal to low angle desiccation cracks with manganese oxide.	ML CL
6	902			3				
7	901	SS-4	1.85	1	Brown to yellowish brown (10YR 5/3 to 5/6) CLAYEY SANDY SILT. Trace gravel, up to 1 1/4" diameter, typically less than 1/2", subangular to angular. Trace organics. Unsorted. Massive to slight platy appearance. Very stiff to hard. Medium plasticity and toughness. High dry strength. Moist to damp. Weathered TILL.		10.5' and 10.9' desiccation cracks, horizontal, iron stained. 10.9' - 11.2' horizontal to low angle desiccation cracks, spacing is 0.02 to 0.05, iron stained. SS-6 spoon wet. No desiccation cracks below 11.2'. SS-7 outside of spoon wet.	
8	900			4				
9	899	SS-5	2.0	2	10.0' - 10.1' fine sand. Wet. Below 10.35' color changes to predominately gray to dark grayish brown (10YR 5/1 to 4/2). Becomes damp. Still hard. Gravel size increasing to typically less than 3/4" to 1". Below 11.2' becomes consistently gray to dark grayish brown (10YR 5/1 to 4/2). Damp. Hard. Unweathered. Massive.			
10	898			5				
11	897	SS-6	1.35	8				
12	896			21				
13	895	SS-7	2.0	10				
14	894			16				
15	893	SS-8	2.0	7				
16	892			9				
17	891	SS-9	2.0	14				
18	890			24				
19	889	SS-10	1.9	4			18.3' - 18.45' limestone gravel, large.	
	888			7				

Eagon & Associates, Inc.

CECOS, Aber Road Facility Williamsburg, Ohio					BOREHOLE LOG		Boring Number MP-407	
Remarks: Installed at staked location adjacent to access road.								
Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
21	887	SS-11	2.0	6 9 10	Gray to dark grayish brown (10YR 5/1 to 4/2) CLAYEY SANDY SILT. Unweathered. TILL.			ML CL
22	886			11				
23	885	SS-12	2.0	4 6 8				
24	884			9				
25	883	SS-13	1.75	6 8 9	Below 24.0' decrease in gravel size, typically less than 1/2".		SS-14 driller notes that material is cutting easier. Added 2 gallons of water to facilitate cutting removal. Driller notes possible sand, 4' of heave in hole from sand. 13.5' of water in borehole	
26	882			12	At 25.0' sand parting, size of parting is less than diameter of sample, more like a vein.			
27	881	SS-14	2.0	6 7 9	Below 26.0' stronger grayish brown hue.			
28	880			10	Change at 28.2'.			
29	879	SS-15	2.0	10 12 9	Gray to dark grayish brown (10YR 5/1 to 4/2). Medium to coarse SAND. Trace to few silt. Trace fine gravel, generally less than 1/2" diameter, subrounded. Loose to medium dense. Generally well graded, fine to coarse sand. Weak stratification, 0.5' to 1.0'. Wet.		Overlying contact is sharp, apparent horizontal. Possibly SM classification in part. Water in borehole after SS-15 drive.	SW
30	878			6	28.8' - 31.4' fine to medium sand seam. Few silt. Trace to no gravel. Poorly graded.			
31	877	SS-16	1.4	1 1 2				
32	876			5				
33	875	SS-17	1.4	2 6 8	Change at 34.7'.		Underlying contact is sharp, apparent horizontal.	
34	874			12				
35	873	SS-18	1.7	5 7 28				
36	872			50				
37	871	SS-19	1.45	20 40 75	Gray to dark gray (10YR 5/1 to 4/1) to grayish brown/dark grayish brown (10YR 5/2 to 4/2) CLAYEY SANDY SILT. Trace gravel, generally less than 1/2" diameter, angular to subrounded. Unsorted, massive appearance. Very hard, indurated. Clasts are generally composed of a high percentage of carbonate rock. Moist to damp. Medium plasticity and toughness. High dry strength. Unweathered. TILL.		Strong reaction with HCL. Plug returns picked up cobbles and large gravel. Very consistent appearance and composition. End 8/9/12, 1600, after driving SS-18 to 36'. Heavy rain with lightning. Begin 8/10/12, 0730. Auger SS-18 interval. 68°F, overcast.	CL ML
38	870	NS						
39	869	SS-20	1.9	20 28 40				
40	868			46				
41	867	SS-21	2.0	28 54 75	Very consistent composition and appearance. Continues to be damp to moist. Unweathered.		No weathering observed. No indication of water.	
42	866			125				
43	865	SS-22	2.0	22 30 65				
44	864			100				
	863	SS-23	2.0	26 46			Borehole continues to be wet and muddy.	

BOREHOLE LOG V2 - ELEVATION CECOS.GPJ EAGON.GDT 10/8/12

Eagon & Associates, Inc.

CECOS, Aber Road Facility Williamsburg, Ohio					BOREHOLE LOG		Boring Number MP-407	
Remarks: Installed at staked location adjacent to access road.								
Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
46	862	SS-23	2.0	60	Gray to grayish brown (10YR 5/1 to 4/1) to grayish brown/dark grayish brown (10YR 5/2 to 4/2) CLAYEY SANDY SILT. TILL. (Continued.)		Continues to be very hard, consistent composition and appearance. No weathering observed. No indication of water.	CL ML
				80				
47	861	SS-24	2.0	15				
				23				
48	860			30				
				50				
49	859	SS-25	2.0	25				
				29				
50	858			35				
				35				
51	857	SS-26	1.8	9	At 50.0' yellowish brown sandstone fragment. Large gravel to cobble size. Driller noted cobble at 50' while augering.			
				15				
52	856			30	Below 50.0' transitional, slight color change to dark gray/dark grayish olive (2.5Y 4/1 to 4/2). Continues to be unweathered. No compositional change. Continues to be very hard.			
				36				
53	855	SS-27	2.0	14	At 51.3' dark brown wood fragment, 1" to 1 1/2" by 1/2" wide, passes through sample. Moist. Highly weathered.			
				20				
54	854			26				
				30				
55	853	SS-28	2.0	11				
				18				
56	852			33				
				35				
57	851	SS-29	1.7	9				
				18				
58	850			24				
				30				
59	849	SS-30	2.0	8	Below 58.0' slight increase in olive color hue. Generally gray/dark grayish olive (2.5Y 4/1 to 4/2). Continues to have massive, unsorted appearance with no apparent compositional change. Medium plasticity and toughness. High dry strength.			
				12				
60	848			17				
				19				
61	847	SS-31	2.0	15				
				15				
62	846			25				
				30				
63	845	SS-32	0.6	12	62.5' - 62.6' sandstone fragment wedged in sampler tip. Blocked recovery.		SS-32 interval augered like till.	
				24				
64	844			30				
				40				
65	843	SS-33	1.5	12				
				14				
66	842			16				
				18				
67	841	SS-34	2.0	8			Relatively sharp color change at 68.85'. Underlying contact at 30° angle.	
				12				
68	840			15	Change at 68.85'.			
				20				
69	839	SS-35	1.9	9	Olive gray (5Y 5/2 to 4/2) CLAYEY SANDY SILT. Trace gravel, up to 1 1/2" diameter, angular to subrounded. Unsorted. Massive to weak layered appearance. Very hard. Medium plasticity and toughness. High dry strength. Trace gray color around clasts. Slightly weathered to unweathered. TILL.		Slightly higher clay content than above till, probably in the few to little range. Moist to damp.	CL ML
				12				
	838			12				
				15				

BOREHOLE LOG V2 - ELEVATION CECOS.GPJ EAGON.GDT 10/8/12

CECOS, Aber Road Facility Williamsburg, Ohio					BOREHOLE LOG		Boring Number MP-407	
Remarks: Installed at staked location adjacent to access road.								
Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
71	837	SS-36	1.95	5	Olive gray (5Y 5/2 to 4/2) CLAYEY SANDY SILT. TILL. (Continued.) Weak layered appearance/color variation. Trace small wood fragments. Below 71.4' color picking up stronger gray color hues, approaching gray/dark gray (5Y 5/1 to 4/1). Color becomes consistent, loses weak color layerings.		Appears unweathered. Strong reaction with acid.	CL ML
72	836			9				
73	835	SS-36	2.0	13				
74	834			15				
75	833	SS-37	1.9	10	Below 74.0' color hues approaching olive gray (5Y 5/2 to 4/2). Clay content increases SANDY SILTY CLAY. Medium plasticity and toughness. High dry strength. Trace wood fragments. Trace gravel, up to 1/2", generally less than 1/4", subangular to subrounded. Moist. Massive. Change at 75.8'. Pale olive/light olive (10Y 6/4 to 5/4), light gray/grayish green (5GY 6/2 to 5/2), and greenish gray (10G 6/1 to 5/1) SHALE and bluish gray (10B 6/1 to 5/1) LIMESTONE. Thinly bedded. Shale is laminated, soft, calcareous. Limestone beds are pulverized by sampling method where weathered and become more competent with depth. Trace marine fossils/fossil fragments.		SS-36 spoon twisted as it was driven, sample was twisted and broken, except for sample tip. No indication of water. End 8/10/12, 1630 at 74.0'. Start 8/13/12, 0830. Logged by SB below 74.0'.	
76	832			20				
77	831	SS-38	1.0	21				
78	830	NS		25				
79	829			150/1	Bottom of Borehole = 79.2'. 77.1' - 79.2' augered without sampling. Cut hard and consistent. Limestone seams at 77 and 78. Augered with center plug in augers. Recovered limestone and shale cuttings with plug returns. 0945 cleaning out borehole by bailing 8 bailers, (dried hole up) then added 25 gallons of water, then bailed out 5 full bailers, then added 50 gallons and removed 13 bailers, then added 10 gallons. Bailed a total of 117 gallons and added a total of 85 gallons prior to setting well. Used 42 gallons of water during drilling. A total of 10 gallons in excess of water removed during bailing was added to the borehole. Monitoring Well MP-407 installed in borehole. For details refer to Monitoring Well Installation Report MP-407.		Strong reaction to HCl.	
80	828			28				
81	827							
82	826							
83	825							
84	824							
85	823							
86	822							
87	821							
88	820							
89	819							
90	818							
91	817							
92	816							
93	815							
94	814							
	813							

Monitoring Well Installation Report

Site Name and Location: *CECOS, Aber Road Facility, Williamsburg, Ohio*

Completion Date: *8/13/12*

Coordinates: *5327.14N 7044.23E*

Borehole Depth (ft): *79.2*

Elevation Top of Casing (ft/MSL): *910.31*

Borehole Diameter (in): *8"*

Elevation Ground Surface (ft/MSL): *907.8*

Drilling Methods: *4 1/4" ID Hollow Stem Auger*

Installed By: *Mike Caproni/Jersey West Drilling*

Completed Drilling: *8/13/12*

Supervised By: *Shay Beanland/Eagon & Associates, Inc.*

Drilling Water Used (gals): *127*

Well Design

Component	Materials	Depth (LSD)	Elevation
Well Protector	4" Diameter Steel with Locking Lid	-2.8 - 2.2	910.6 - 905.6
Riser	2" Diameter Schedule 40 PVC	-2.5 - 74.0	910.3 - 833.8
Surface Seal	24" Diameter Concrete	-0.4 - 2.5	908.2 - 905.3
Grout Seal	"Pure Gold" Bentonite Grout	2.5 - 69.5	905.3 - 838.3
Bentonite Seal	3/8" Bentonite Chips	69.5 - 72.0	838.3 - 835.8
Sand Pack	No. 5 "Global" Silica Sand	72.0 - 79.2	835.8 - 828.6
Screen	2" Diameter 10-Slot Schedule 40 PVC	74.0 - 78.8	833.8 - 829.0
Well Point Blank	2" Diameter Schedule 40 PVC Cap	78.8 - 79.2	829.0 - 828.6

Well Development

Well Depth (ft, TOC):

81.7

Depth to Water (ft, TOC):

15.38

Well Volume (gals):

10.8

Volume Purged (gals):

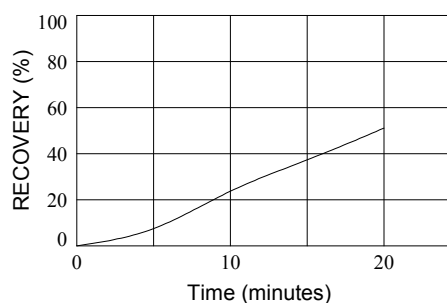
955.3

Development Method:

Surge block, bailer, bladder pump, grundfos pump

Date	Time	Cumulative Volume Removed (gals)	Temp (°C)	Specific Conductivity (µmhos/cm)	pH (S.U.)	Turbidity (NTU)
8/16/12	1318	10.68	16.8	1913	6.86	>1000
8/17/12	1516	106.36	14.8	2440	7.66	823.0
8/22/12	1430	476	16.9	1988	7.45	479.0
8/23/12	1500	696	16.6	192.5	7.42	40.3
8/29/12	1321	866.25	16.4	1823	7.57	264.0
8/29/12	1637	915	-	-	-	14.0

Recovery Data



Sampling Equipment:

Bladder pump

Comments:

Well riser and screen are "Johnson" flush threaded sections with o-ring seals. Bentonite grout mixed to 30% specifications.



















Boring depth=79.2 ft.

BOREHOLE LOG

Site Name and Location: CECOS, Aber Road Facility Williamsburg, Ohio		Drilling Methods: 4 1/4" ID Hollow Stem Auger				Boring Number: MP-408	
Drilling Firm: <i>Jersey West Drilling</i>		DATE	TIME	DEPTH DRILLED (ft)	WATER LEVEL (ft)	Page 1 of 5	
Driller / Rig: <i>Mike Caproni/Acker Soil Max</i>							
Logged by: <i>David Sugar</i>		<u>Sampling Methods:</u> ST = Shelby Tube WS = Waxed Sample SP = Sand Pump DP = Direct Push CT = Cuttings SS = Split Spoon CS = Continuous Sampler C = Coring NS = Not Sampled B = Bailer				Start	Finish
Coordinates: <i>5431.14N 7306.96E</i>							
Surface Elevation: <i>913.8 ft/MSL</i>						<i>Time</i> <i>0745</i>	<i>Time</i> <i>0926</i>
Surface Conditions / Weather: <i>Grass covered, flat, dry / 70°, Overcast</i>						<i>Date</i> <i>8/14/12</i>	<i>Date</i> <i>8/17/12</i>

Remarks: Installed at staked location approximately 70' west of 14.7 adjacent to access road.

Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or FQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
1	913	SS-23	0.6	5	Gravel and cobble road bed.		Continuous 2" OD, 2" drive split-spoon sampling. 8 1/4" diameter borehole. 300 lb manual hammer.	
2	912			7	Change at 1.2'.		Strong to moderate reaction with acid. Possibly CL classification in part.	CL
3	911	SS-2	1.25	4	Grayish brown to yellowish brown (10YR 5/2 to 5/4) and dark grayish brown to dark yellowish brown (10YR 4/2 to 4/4) CLAYEY SAND SILT to SANDY CLAYEY SILT. Trace gravel, up to 1" diameter. Unsorted, weak to layered to mottled appearance. Generally medium to high plasticity and toughness. High dry strength. Moist. SOIL FILL. Recompacted till and possibly subsoil material.		Ran 4" steel center plug while augering.	ML
4	910			3				
5	909	SS-3	1.75	1				
6	908			2				
7	907	SS-4	1.55	1			Underlying contact is transitional over all. Contact may be as high as 7.3'.	
8	906			1	Change at 7.4'.			
9	905	SS-5	1.8	2	Gray to yellowish brown (10YR 5/1 to 5/6) and dark gray to dark yellowish brown (10YR 4/1 to 4/6) SILTY CLAY. Trace to few sand. Trace roots. Trace (rare) gravel, generally fine (<3.8"). Clasts are typically very weathered. Mottled to weak layered appearance. Moist. High plasticity, toughness, and dry strength. Weathered. SUBSOIL.		No reaction with acid. Possibly CH in part.	CL
10	904			1			8.8' - 10.8' generally gray to dark gray with yellowish brown mottling.	
11	903	SS-6	2.0	1	At 10.85' fine silty sand parting. Moist. At 30° angle.			
12	902			3	Below 10.9' gravel and sand content increasing. Picking up till appearance. Approaching MC-CL classification. Strong yellowish brown color hues. Clasts continue to be highly weathered to completely weathered.		11.2' - 11.7' well developed root trace. Underlying contact is transitional, may be as high as 11.7'. No reaction with acid.	
13	901	SS-7	2.0	3	Change at 12.7'.			
14	900			4	Brown to yellowish brown to dark yellowish brown (10YR 5/3 to 5/6 and 4/3 to 4/6) CLAYEY SANDY SILT. Trace gravel, up to 1" diameter, generally angular to subrounded. Some clasts are highly weathered to completely weathered. Unsorted, weak layered to massive appearance. Medium plasticity and toughness. High dry strength. Moist to damp. Hard to very hard. Weathered. Till.		Slight to moderate reaction with acid.	ML
15	899	SS-8	2.0	7			Below 13.7' becomes very hard, generally damp. Possible desiccation cracks, if present they are very poorly developed.	CL
16	898			8	13.4' to 13.5' sand parting, 1/4" thick at 50° angle. Does not appear wet. Moist.			
17	897	SS-9	2.0	11	14.0' to 14.55' sand parting at 70° angle. Moist.			
18	896			17	Below 14.55' primarily grayish brown to dark grayish brown to brown color (10YR 5/2 to 4/2 and 5/3 to 4/3).		Below 17.2' desiccation cracks present, generally at 0.5' to 0.2' intervals. Faces are oxidized yellowish brown with iron oxide precipitate. No indication of water.	
19	895	SS-10	1.75	20	17.9' to 18.0' sandy seam under large gravel fragment. Damp.			
	894			27	Below 18.8' color changing to gray to dark gray (10YR 5/1 to 4/1) to grayish brown/dark grayish brown (10YR 5/2 to 4/2). Becoming unweathered. Only a trace of yellowish brown color.		At 18.0' added 2 gal. water to inside of augers.	

CECOS, Aber Road Facility Williamsburg, Ohio					BOREHOLE LOG		Boring Number MP-408	
Remarks: Installed at staked location approximately 70' west of 14.7 adjacent to access road.								
Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
21	893	SS-11	1.7	17	Gray to dark gray (10YR 4/1 to 5/1) to grayish brown to dark grayish brown (10YR 4/2 to 5/2) CLAYEY SANDY SILT. TILL. (Continued.) Below 20.4' greenish gray to dark gray to grayish brown to dark grayish brown color. Unweathered. No yellowish brown oxidation. Very consistent. Massive. TILL. Clasts are generally unweathered and composed of a relatively high percentage of carbonate rocks. 22.0' to 21.4' develops platy texture. No apparent compositional change.		Strong reaction with HCl. Very hard, damp. No indication of water. At 20.4' yellowish brown horizontal desiccation crack. No indication of water.	ML CL
				26				
				26				
22	892	SS-12	1.4	30			Below 20.4' no desiccation cracks observed. Consistent. Unweathered.	
				11				
				18				
23	891	SS-13	2.0	27	Below 24.0' picking up stronger grayish brown to dark grayish brown color hues. Still within the range of 10YR 4/1, 5/1 to 4/2, 5/2. Very slight and gradational change. No indication of weathering.		Augering SS-13 added ~2 gal. water outside of augers. Augering very hard.	
				27				
				27				
24	890	SS-14	2.0	10	At 25.95' sand pod/inclusion. Moist.			
				13				
				14				
25	889	SS-15	2.0	22				
				9				
				10				
26	888	SS-16	2.0	15	Below 29.5' consistent grayish brown to dark grayish brown color (10YR 4/2 to 5/2). Color transition is very gradual. No indication of weathering. No apparent compositional change.		At 30.0' added ~2 gal. water to outside of augers to help drilling/cutting removal. No indication of water. Drilling continues to be very hard.	
				15				
				15				
27	887	SS-17	1.1	9				
				12				
				12				
28	886	SS-18	1.8	14	Below 35.1' picking up strong gray to dark gray color. Change at 35.35'.		Underlying contact is relatively sharp. Apparent horizontal to about 5°. Trace incorporation of sand from 35.25' - 35.35'. Strong reaction with HCl.	
				9				
				22				
29	885	SS-19	1.5	32	Gray to dark gray (10YR 5/1 to 4/1) medium to coarse SAND with GRAVEL. Trace to few silt. Well graded. Dense. Gravel is generally less than 3/8", subrounded. Unweathered. Wet. Change at 36.3'. Grayish brown to dark grayish brown to gray/dark gray (10YR 5/1, 5/2, 4/1, 4/2) CLAYEY SANDY SILT. Trace gravel, generally less than 1/2" diameter, angular to subrounded. Unsorted, generally has a platy texture. Very hard. Medium plasticity and toughness. High dry strength. Damp. Unweathered. TILL.		Possibly SM in part. Strong reaction with HCl. Water in augers after SS-18 drive.	SW
				29				
				29				
30	884	SS-20	1.1	8			No weathering features observed. Strong reaction with HCl.	ML CL
				8				
				13				
31	883	SS-21	1.5	20	Below 40.0' platy texture decreasing. Massive, unsorted appearance. Very hard. Stronger gray to dark gray colors, very slight change. Still within the range of grayish brown to dark grayish brown to gray/dark gray.		37.5' - 38.0' and 39.5' - 40.0' augered like till.	
				24				
				40				
32	882	NS		40			At 40.5' bluish gray shale fragments.	
				100				
				100				
33	881	SS-22	1.6	32				
				50				
				70				
34	880	SS-23	1.6	32			Below 44.3' trace bluish gray shale fragments (rare).	
				57				
				14				
35	879	SS-23	1.6	28				
				33				
				47				
36	878	SS-23	1.6	60				
				16				
				28				
37	877	SS-23	1.6	35				
				57				
				14				
38	876	SS-23	1.6	26				
				14				
				26				

CECOS, Aber Road Facility Williamsburg, Ohio					BOREHOLE LOG		Boring Number MP-408			
Remarks: Installed at staked location approximately 70' west of 14.7 adjacent to access road.										
Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS		
46	868	SS-23	1.6	26 30	Gray to dark gray to grayish brown to dark grayish brown (10YR 5/1, 5/2 to 4/1, 4/2) CLAYEY SANDY SILT. TILL. (Continued.)		Continues to be very hard, unweathered. Damp. No indication of water. Massive, unsorted appearance. Strong reaction with HCl.	ML CL		
				23	Very consistent massive, unsorted appearance. Medium plasticity and toughness. High dry strength. Unweathered.					
47	867	SS-24	1.75	28 47						
48	866			60						
49	865	SS-25	1.9	20 28 32						
50	864			45						
51	863	SS-26	1.8	26 23 29						
52	862			38						
53	861	SS-27	1.9	18 25 28						
54	860			38	At 54.8' bluish gray shale and limestone fragment.			End 8/14/12, 1705 at 54.0'. Begin 8/15/12, 0745, 70°F sunny.		
55	859	SS-28	1.95	16 23 56						
56	858			65				Added 25 gal water at 54.0'.		
57	857	SS-29	1.75	14 24 38	Below 56.5' percentage of bluish gray shale and limestone fragments increasing. Percentage of gravel continues to be trace. Cobble content probably increased.			Continues to be unweathered, very hard. No indication of water.		
58	856			45						
59	855	SS-30	1.7	14 18 23				SS-30 limestone and shale fragment in tip of sampler.		
60	854			45						
61	853	SS-31	1.8	10 11 17	Large gravel/cobble size shale and limestone fragments at 60.3' - 60.4' and 61.3' - 61.5'.			At 60.0' added 10 gal water.		
62	852			46						
63	851	SS-32	2.0	8 14 19	Change at 63.5'.			Underlying contact is sharp, apparent horizontal. 63.4'-63.5' till color changes picks up stronger gray hue. Strong reaction with HCl.		
64	850			95	Gray to dark gray (10YR 5/1 to 4/1) SILTY SAND. Trace fine gravel. Well graded. Silt content in the few to little range. Possibly a trace of clay. Slightly cohesive. Moist to wet. Dense. Change at 64.2'.			Appears fluvial, very dirty. Strong reaction with HCl. Underlying contact is transitional 64.15' - 64.2'.	SM	
65	849	SS-33	1.9	14 17 21	Grayish brown to dark grayish brown (10YR 5/2 to 4/2) CLAYEY SANDY SILT. Trace gravel, generally less than 1" diameter, angular to subrounded. Medium plasticity and toughness. High dry strength. Unsorted, massive appearance. Very hard. Damp. Unweathered. TILL.			Strong reaction with HCl. Same composition and appearance as overlying till. Slightly stronger brown color. No indication of desiccation cracks or water.	ML CL	
66	848			25						
67	847	SS-34	1.9	12 24 20						
68	846			28						
69	845	SS-35	2.0	10 12 13	Lower blow counts for SS-35 appear due to slightly lower gravel content or smaller gravel size. Formation continues to be very hard, moisture content slightly higher (moist).				At 68.0' flushed augers with 75 gal water.	
	844			19						

Eagon & Associates, Inc.

CECOS, Aber Road Facility Williamsburg, Ohio					BOREHOLE LOG		Boring Number MP-408	
Remarks: Installed at staked location approximately 70' west of 14.7 adjacent to access road.								
Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
71	843	SS-36	0.0	16 32 31	Grayish brown to dark grayish brown (10YR 5/2 to 4/2) CLAYEY SANDY SILT. TILL. (Continued.)		SS-36 interval augered like till. Plug recovery was 1.6', all till. Lost recovery probably due to cobble or large gravel blocking sampler. No weathering observed. Trace weathered clasts.	ML CL
72	842	SS-37	1.6	50	Below 72.0' trace grayish olive to dark grayish olive (10Y 5/2 to 4/2) zones. Appears to be incorporation of grayish olive till unit. Trace weathered clasts. Overall color remains grayish brown to olive brown.		Underlying contact is sharp, apparent horizontal. Organic partings at contact.	
73	841			7 13 35				
74	840			50				
75	839	SS-38	1.7	4 12 23	Change at 74.65'. Gray to dark gray (10YR 5/1 to 4/1) SAND. Trace rare gravel, up to 1/2" diameter. Trace to few silt. Generally well graded, fine to coarse sand. Dense. Wet. Grades coarser with depth.		SM in part. Strong reaction with HCl. Underlying contact may be as high as 75.7'.	SW
76	838	SS-39	1.6	27	74.65' - 75.15' fine to very fine sand seam. Few silt. Trace organic partings. Wet. Poorly graded. SM.		Possibly GC classification in part from 76.0' to 78.0'. Strong reaction with HCl.	GM
77	837			18 33 67	Below 78.0' trace to no clay. Slightly cleaner, but probably still classifies as a silty sand and gravel with cobbles.	Gray to dark gray (10YR 5/1 to 4/1) SILTY SAND and GRAVEL with COBBLES. Trace grayish olive to olive till gravel or inclusions. Trace to few clay. Clasts are typically angular to subangular, some are highly weathered. Unsorted. Unweathered. Wet.	SS-40 poor recovery below 79.5' due to soft material (low blow count).	
78	836			62				
79	835	SS-40	1.7	13 14 24				
80	834	SS-41	1.9	6	Change at 80.2'. Gray to dark gray (10YR 5/1 to 4/1) SAND. Predominately fine sand. Trace medium to coarse sand. Trace to few silt. Poorly graded. Dense. Unweathered. Wet. Trace black organic material.		Possibly SM classification in part. Gravel fragment at contact, sharp transition to till.	SP
81	833			12 11 11	Change at 81.35'. Grayish olive to dark grayish olive (10Y 4/2 to 5/2) and dark greenish gray to very dark greenish gray (10Y 4/1 to 3/1) SANDY CLAYEY SILT. Trace gravel, up to 1 1/2" diameter, generally subrounded to angular. Unsorted, weak layered to mottled appearance. Medium to high plasticity. Medium toughness. High dry strength. Hard. Color variation may be due to weathering, reduced brown forming olive color hues. TILL.		Possibly ML-CL classification. Appears to have slightly higher clay content than overlying till.	CL
82	832			SS-42	1.9	11	Dark greenish gray color becoming more prominent with depth. Below 70.5' consistent dark greenish gray color. Limestone and shale fragments usually have bluish gray to olive green colors.	
83	831	9 17 26						
84	830	26						
85	829	SS-43	1.45	8 9 17	Below 88.0' cobble content appears to be increasing. Becomes softer, stiff. Moist. Difficult to sample with gravel and cobbles. Clay content may be slightly higher.		End 8/15/12, 17:45 at 88.0'. Used a total of 20 gal water on 8/15.	
86	828	SS-44	1.8	22				
87	827			7 13 53				
88	826	SS-45	0.55	25	88.4' - 88.55' limestone cobble. Probable cause of lost recovery, blocked sampler tip. Trace greenish gray shale associated with cobble.		Begin 8/16/12, 07:30, 65°F sunny.	
89	825			21 12 16				
90	824			22				
91	823	SS-46	0.65	9 9 10	SS-45 auger plug recovery 1.3' with large limestone gravel at top of recovery. Recovery is all greenish gray till.		Prior to augering SS-45 flushed with 100 gal of water. Continues to have a strong reaction with acid. Color changes appear to be due to incorporation of material rather than weathering.	
92	822	SS-47	2.0	11	92.0' - 92.6' sandy till. SANDY SILT/SILTY SAND with CLAY. Few to little clay. Trace gravel.			
93	821			12 15	92.0' - 93.4' color change, greenish gray with reddish gray/weak red (5R 5/1 to 5/3) mottling. Strong reaction with acid.			
94	820			34	Change at 93.9'. Dark greenish gray to very dark greenish gray (10Y 4/1 to 3/1) SANDY SILT. Trace to no clay. Laminated, but highly deformed. Medium dense. Poorly graded. Damp to moist. Sand content is fine to very fine. Noncohesive to slightly cohesive, holds			
819		SS-48	1.75	6 4			94.6' - 94.8' angular/deformed grayish green clay seam. In part silty sand. SM.	ML

BOREHOLE LOG V2 - ELEVATION CECOS.GPJ EAGON.GDT 10/8/12

CECOS, Aber Road Facility Williamsburg, Ohio					BOREHOLE LOG		Boring Number MP-408	
Remarks: Installed at staked location approximately 70' west of 14.7 adjacent to access road.								
Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
96	818	SS-48	1.75	10	split-spoon form. Dark greenish gray to very dark greenish gray (10Y 4/1 to 3/1) SANDY SILT. (Continued.)		Continues to be damp to moist. Highly deformed. Rapid dilatancy when water is added. Possibly SM in part. Strong reaction with HCl.	ML
		12						
97	817	SS-49	2.0	5	Trace black material, possibly organic material, generally occurs along partings, highly deformed.			
				6				
				8				
98	816			7				
99	815	SS-50	2.0	4	Change at 98.6'. Grayish olive/dark grayish olive (10Y 5/2 to 4/2), greenish gray to dark greenish gray (10Y 5/1 to 4/1) and (5GY 5/1 to 4/1) CLAY. Few to little silt. Trace sand and fine gravel. Unsorted. Weak layered to mottled structure. Stiff. High plasticity, toughness, and dry strength. Weathered. COLLUVIUM.		No reaction with acid. Does not appear to be till.	CL CH
				4				
				4				
100	814			6				
101	813	SS-51	2.0	3	Change at 100.15'. Dark gray to very dark gray (2.5Y 4/1 to 3/1) CLAYEY SILT. Trace sand and gravel. Trace to few organic material, highly decomposed twig fragments. Trace greenish gray clay/weathered shale inclusions or partings. Weak layered appearance. High plasticity. Medium toughness. High dry strength. Moist. ALLUVIAL with SOIL development.		No reaction with acid. 101.9' - 102.0' gray silt seam, reaction with acid. 101.9' - 102.2' grayish olive/dark grayish olive clay seam. Appears colluvial. Does not react with HCl.	CL
				4				
				5				
102	812			6				
103	811	SS-52	2.0	3	Change at 103.2'. Gray to dark gray (5Y 5/1 to 4/1) SANDY SILT. Sand content is fine to very fine. Trace, rare medium to coarse sand. Structureless appearance. Holds split-spoon form. Nonplastic. Moist. Unweathered.		Strong reaction with acid.	ML
				4				
				5				
104	810			6				
105	809	SS-53	2.0	2	Change at 104.0'. Gray to dark gray (5Y 5/1 to 4/1) CLAYEY SILT. Few sand, generally fine to very fine, trace medium to coarse. Trace gravel, generally less than 1" diameter, subrounded. Stiff. Unsorted. Feathered appearance when sample is split. High plasticity. Medium toughness. High dry strength. Unweathered. Moist. TILL?		Strong reaction with acid. Possibly lacustrine with drop stones.	CL
				3				
				4				
106	808			5				
107	807	SS-54	0.7	3	Change at 106.0'. Very dark gray to black (2.5Y 3/1 to 2.5/1) CLAYEY SILT. Organic rich, organic odor. Few to little fine sand. Weak layered appearance. Stiff. High plasticity. Medium to low toughness. High dry strength. PALEOSOL.		No reaction with acid. Overlying contact appears deformed. Possibly CL classification.	OL
				4				
				6				
108	806			8				
109	805	SS-55	0.9	9	Change at 108.0'. Grayish olive/dark grayish olive to greenish gray/dark greenish gray (10Y 5/1, 5/2 to 4/1, 4/2) SILTY CLAY with GRAVEL and COBBLES. Unsorted, jumbled appearance. Clasts vary from angular to subrounded. Quartzite clast at 108.5'. In part clast supported. Colluvium.		SS-54 interval augered smooth without cobbles, augered cobbly below 108.0'. At 110.0' auger refusal. End 8/16/12, 1450 at 110.0'. Begin 8/17/12, 0800, 65°F, light rain. Switch over to 4 1/4" tri-cone with water circulation. Start rotary drilling at 0900. 0926 finished drilling. Used total of 315 gal water during rotary drilling.	CL
				100				
110	804	NS			Bluish gray to gray INTERBEDDED LIMESTONE and SHALE. Bit advanced hard and soft, interbedded limestone and shale.			
111	803							
112	802							
113	801							
114	800							
115	799				Bottom of Borehole = 114.0'. 1040 pulled augers back 6 feet to ~104.0'. Start bailing borehole through augers. 1123 stopped bailing, removed 110 gal. 4' sand in bottom of borehole, will flush prior to selling well. Used 625 gallons of water to flush well, most water returned to surface. Used 3" split spoon to remove coarse sand from bottom of borehole.		Monitoring well MP-408 installed in borehole. See Monitoring Well Installation Report MP-408 for details.	
116	798							
117	797							
118	796							
119	795							
	794							

Monitoring Well Installation Report

Site Name and Location: *CECOS, Aber Road Facility, Williamsburg, Ohio*

Completion Date: *8/17/12*

Coordinates: *5431.14N 7306.96E*

Borehole Depth (ft): *114.0*

Elevation Top of Casing (ft/MSL): *916.41*

Borehole Diameter (in): *7 3/4"*

Elevation Ground Surface (ft/MSL): *913.8*

Drilling Methods: *4 1/4" ID Hollow Stem Auger*

Installed By: *Mike Caproni/Jersey West Drilling*

Completed Drilling: *8/17/12*

Supervised By: *David Sugar/Eagon & Associates, Inc.*

Drilling Water Used (gals): *1240*

Well Design

Component	Materials	Depth (LSD)	Elevation
Well Protector	4" Diameter Steel with Locking Lid	-2.9 - 2.1	916.7 - 911.7
Riser	2" Diameter Schedule 40 PVC	-2.6 - 107.3	916.4 - 806.5
Surface Seal	24" Diameter Concrete	-0.5 - 2.5	914.3 - 911.3
Grout Seal	"Pure Gold" Bentonite Grout	2.5 - 102.3	911.3 - 811.5
Bentonite Seal	3/8" Bentonite Chips	102.3 - 105.3	811.5 - 808.5
Sand Pack	No. 5 Global Silica Sand	105.3 - 112.4	808.5 - 801.4
Screen	2" Diameter 10-Slot Schedule 40 PVC	107.3 - 112.1	806.5 - 801.7
Well Point Blank	2" Diameter Schedule 40 PVC Cap	112.1 - 112.4	801.7 - 801.4
Sand Pack Bottom	No. 5 Global Silica Sand	112.4 - 114.0	801.4 - 799.8

Well Development

Well Depth (ft, TOC): <i>115.0</i>	Depth to Water (ft, TOC): <i>22.63</i>	Well Volume (gals): <i>15.1</i>	Volume Purged (gals): <i>358.9</i>
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Development Method:
Surge block, bailer, bladder pump, grundfos pump

Date	Time	Cumulative Volume Removed (gals)	Temp (°C)	Specific Conductivity (µmhos/cm)	pH (S.U.)	Turbidity (NTU)	Recovery Data
8/22/12	1000	5.00	-	-	-	>1000	
8/22/12	1524	44.4	14.1	1743	7.19	>1000	
8/29/12	1125	155.02	16.3	2930	7.40	85.5	
8/30/12	1605	292.69	17.6	2660	7.20	51.3	
8/31/12	0950	340.53	17.6	1916	7.23	18.4	
8/31/12	1206	358.21	19.2	1900	7.17	9.4	

Sampling Equipment:

Bladder pump

Comments:

Well riser and screen are "Johnson" flush threaded sections with o-ring seals. Bentonite grout mixed to 30% specifications. Most drilling water returned to surface with cuttings or as surface discharge.

Boring depth=114.0 ft.

BOREHOLE LOG

Site Name and Location: CECOS, Aber Road Facility Williamsburg, Ohio		Drilling Methods: 4 1/4" ID Hollow Stem Auger				Boring Number: MP-409	
Drilling Firm: <i>Jersey West Drilling</i>		DATE	TIME	DEPTH DRILLED (ft)	WATER LEVEL (ft)		
Driller / Rig: <i>Mike Caproni/Acker Soil Max</i>							
Logged by: <i>David Sugar</i>		<u>Sampling Methods:</u> ST = Shelby Tube WS = Waxed Sample SP = Sand Pump DP = Direct Push CT = Cuttings SS = Split Spoon CS = Continuous Sampler C = Coring NS = Not Sampled B = Bailer				<i>Page 1 of 4</i>	
Coordinates: <i>5948.01N 8697.78E</i>						Start	Finish
Surface Elevation: <i>909.3 ft/MSL</i>						<i>Time</i> <i>1045</i>	<i>Time</i> <i>1304</i>
Surface Conditions / Weather: <i>Dry, grass covered, edge of access road / 70°F, Sunny</i>						<i>Date</i> <i>8/20/12</i>	<i>Date</i> <i>8/22/12</i>

Remarks: Installed at staked location, east side of access road.

Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or FQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
1	909	SS-1	0.50	4	Gray gravel and cobble ROAD BED and SOIL FILL. Soil fill is recompacted till. Recompacted soil below ~1.0'. Moderate to strong reaction with acid.		Continuous 2" OD, 2' drive split-spoon sampling. 300 lb. manual hammer. Ran 4" steel plug while augering. Strong reaction with acid.	ML CL
	908			6				
2		SS-2	1.15	2	Below 2.0' appears to be sandy silt wash material. Change at 2.7'.			
	907			2				
3		SS-3	1.50	1	Gray/yellowish brown and dark gray/dark yellowish brown (10YR 5/1 to 5/6 and 4/1 to 4/6) SILTY CLAY. Few to little sand. Trace, rare gravel, generally less than 1/2" diameter, subrounded to subangular. High plasticity. Medium to high toughness. High dry strength. Moist. Unsorted, generally has a weak layered to mottled appearance. Trace roots/root trace with associated gray reduction. SUBSOIL.		Possibly CH classification in part. No reaction with acid.	CL
	906			1				
4		SS-4	2.0	2	4.6' - 5.1' dark gray zone, weak layered structure.		Underlying contact is transitional, may be as deep as 7.0', strong till appearance below 7.0'.	
	905			1				
5		SS-5	2.0	2	Change at 6.4'.		Note very slight reaction with acid. Borehole is dry. Below 7.0' strong reaction with acid.	ML CL
	904			2				
6		SS-6	2.0	3	Grayish brown/yellowish brown and dark grayish brown/dark yellowish brown (10YR 5/2 to 5/4 and 4/2 to 4/4) CLAYEY SANDY SILT. Trace gravel, up to 1" diameter, angular to subrounded. Unsorted, massive to mottled appearance. Medium toughness and plasticity. High dry strength. Hard to very hard. Damp. Weathered. TILL.		Below 7.6' trace iron oxide and possibly manganese oxide precipitates, appear associated with poorly developed desiccation cracks. Damp to dry.	
	903			4				
7		SS-7	2.0	6	At 8.2', 8.35', and 8.85' fine silty sand partings, near horizontal to 30° angle. Damp to dry.		Generally have associated iron oxide precipitates. Till picking up strong gray color hues.	
	902			17				
8		SS-8	1.8	9	8.85' - 8.95' sandy till zone. Damp.		Desiccation cracks are usually horizontal or low angle, 0.4' to 0.2' apart.	
	901			17				
9		SS-9	2.0	21	Below 10.9' color varies from gray/dark gray to grayish brown/dark grayish brown (10YR 5/1 - 4/1 to 5/2 - 4/2). Gray color increasing with depth, becoming unweathered.		High angle, near vertical desiccation cracks from 14.0' - 14.25', 14.5' - 14.95' and 15.3' - 16.6'. Faces are coated with dark reddish brown iron oxide. No indication of water. Borehole continues to be dry.	
	900			32				
10		SS-10	2.0	9	Below 16.9' becomes unweathered, consistent gray/dark gray color (10YR 5/1 to 4/1). Massive, unsorted appearance.		SS-9 interval added 2 gal water to help feed cuttings to surface.	
	899			17				
11		SS-11	2.0	26	At 16.9' oxidized, near horizontal, desiccation crack. No indication of water.			
	898			35				
12		SS-12	2.0	10	Below 18.9' slightly lower moisture content, damp. Slightly harder.			
	897			16				
13		SS-13	2.0	17				
	896			17				
14		SS-14	2.0	19				
	895			9				
15		SS-15	2.0	12				
	894			14				
16		SS-16	2.0	16				
	893			8				
17		SS-17	2.0	13				
	892			15				
18		SS-18	2.0	15				
	891			8				
19		SS-19	2.0	12				
	890			25				
				50				

Eagon & Associates, Inc.

CECOS, Aber Road Facility Williamsburg, Ohio					BOREHOLE LOG		Boring Number MP-409	
Remarks: Installed at staked location, east side of access road.								
Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
21	889	SS-11	2.0	25	Gray/dark gray (10YR 5/1 to 4/1) CLAYEY SANDY SILT. TILL. (Continued.)		SS-11 interval added 4 gal water to help with cutting removal. No weathering features observed. No indication of water.	ML CL
	30			Continues to be unweathered, very hard, with consistent massive appearance.				
	30							
22	888	SS-12	2.0	37	25.3' - 25.8' gray silt seam. Little very fine sand. Weak laminated to layered appearance. Damp to moist. Unweathered. Change at 26.1'.		Strong reaction with HCl.	
	13							
	27							
23	887	SS-13	2.0	48	25.3' - 25.8' gray silt seam. Little very fine sand. Weak laminated to layered appearance. Damp to moist. Unweathered. Change at 26.1'.		Driller noted cobble from 26.0' - 26.2'. Sharp color change at contact.	
	48							
	21							
24	886	SS-14	1.5	45	Olive gray (5Y 5/2 to 4/2) SANDY SILT. Few to little clay. Trace gravel, generally fine, less than 1/2", angular to subrounded. Trace very sandy zones and sand/silt partings. Unsorted, weak layered appearance. Medium to low plasticity and toughness. High dry strength. Very hard. Damp to moist. Unweathered, slightly weathered? TILL. Below 27.2' sand partings are not very prominent.		Strong reaction with HCl. SS-14 sampler stopped penetration, bouncing on cobble? Trace gray till areas incorporated into unit. Driller indicated that contact or zone may be making a trace of water	ML CL
	48							
	52							
25	885	NS		16	27.4' - 28.5' sandy till zone. Trace to few clay. 28.5' - 28.7' olive gray sandy silt/silty sand seam. Medium to rapid dilatancy. Wet.		Below 28.7' strong till appearance with gravel, up to 1 1/2" diameter.	
	38							
	100							
26	884	SS-15	1.95	27	At 29.5' olive gray sand parting. Moist. Near horizontal but irregular surface. 29.8' - 30.0' till becomes sandy, trace to few clay.		End 8/20/12, 1620 at 30.0'. WL = 26.13' at 1654, 8/20/12 from ground surface. WL = 10.60' at 0745, 8/21/12. Begin 8/21/12 at 0800, 60°F, sunny.	
	20							
	30							
27	883	SS-16	1.9	50	Below 30.2' becomes mottled with olive gray (5Y 5/2 to 4/2) and gray/dark gray to brownish gray/dark brownish gray (2.5Y 5/1 - 4/1 to 5/2 - 4/2). Below 30.8' consistent gray/dark gray to brownish gray/dark brownish gray CLAYEY SANDY SILT. Massive, unsorted appearance. Gravel up to 1" diameter, angular to subrounded, very hard. Damp to moist. Unweathered. Trace weathered clasts. Medium plasticity and toughness. High dry strength.		Very consistent appearance below 30.8'.	
	65							
	15							
28	882	SS-17	1.85	32	At 36.7' 1/8" x 3/8" thin wood fragment. Soft but flexible with no significant decay.		Prior to augering SS-19 added 4 gal water to thin mud in augers.	
	52							
	80							
29	881	SS-18	2.0	17	38.6' - 38.8' weak reddish color incorporated in till, very slight. At 38.7' gray silt parting. Damp.		SS-20 drove slightly easier, no apparent compositional change. May reflect a slight increase in moisture content.	
	30							
	30							
30	880	SS-19	2.0	50	SS-21 interval augered cobbly.		Prior to augering SS-21 added 5 gal water to thin mud.	
	16							
	23							
31	879	SS-20	1.7	35	SS-22 cobble fragments in top of recovery. Probably hit a second cobble at ~43'.		Driller indicated that SS-22 interval augered very hard, no drilling change above or below interval observed.	
	53							
	12							
32	878	SS-21	1.8	19				
	24							
	32							
33	877	SS-22	0.6	8				
	13							
	36							
34	876	SS-23	1.9	43				
	36							
	78							
35	875			17				
	30							
	18							
36	874			17				
	30							
	18							
37	873			17				
	30							
	18							
38	872			17				
	30							
	18							
39	871			17				
	30							
	18							
40	870			17				
	30							
	18							
41	869			17				
	30							
	18							
42	868			17				
	30							
	18							
43	867			17				
	30							
	18							
44	866			17				
	30							
	18							
44	865			17				
	30							
	18							

BOREHOLE LOG V2 - ELEVATION CECOS.GPJ EAGON.GDT 10/8/12

CECOS, Aber Road Facility Williamsburg, Ohio					BOREHOLE LOG		Boring Number MP-409	
Remarks: Installed at staked location, east side of access road.								
Depth (feet)	Elev. (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
46	864	SS-23	1.9	20	Gray/dark gray to grayish brown/dark grayish brown (2.5Y 5/1 - 4/1 to 5/2 - 4/2) CLAYEY SANDY SILT. TILL. (Continued.)		Continues to be unweathered, very hard till. Strong reaction with HCl. No weathering observed. Very consistent appearance.	ML CL
		863			34			
47		SS-24	1.9	18				
				862			24	
48				44				
		861		10			Prior to augering SS-25 interval, added 20 gal water to thin mud in augers.	
49		SS-25	1.9	22				
				860		25		
50				40	At 49.4' brown/brownish olive chert gravel, ~1" diameter, angular. Plug from SS-25 interval recovered a 3" diameter, unweathered, dolomite cobble.			
		859		13			SS-26 recovery, upper 0.5' was disturbed, sample appears to have twisted while being driven. Possibly due to cobble.	
51		SS-26	2.0	21				
				858		25		
52				28				
		857		10				
53		SS-27	1.85	22				
				856		22	Below 53.0' slightly stronger grayish brown color hue.	Continues to be unweathered.
54				28				
		855		12				
55		SS-28	2.0	22	54.75' - 54.95' trace bluish gray shale incorporated in till.			
				854		25		
56				30				
		853		9				
57		SS-29	2.0	13				
				852		23		
58				27				
		851		13			Prior to augering SS-30 interval, flushed augers through drill rods with 50 gal water.	
59		SS-30	1.8	18				
				850		18		
60				24				
		849		15	At 60.15' olive brown sandstone in sampler tip, blocked recovery.		Underlying transition may be as high as 60.2' based on plug returns.	
61		SS-31	0.2	24				
				848		27	SS-31 interval augered like till. Plug recovery was grayish brown/dark grayish brown till with cobbles.	
62				38	Change at 62.0'.			
		847		8	Grayish olive to dark grayish olive (10Y 5/2 to 4/2) and gray/dark gray (5Y 5/1 to 4/1) CLAYEY SANDY SILT. Gray/dark gray color increasing with depth. Trace gravel, generally less than 1/2" diameter, angular to subrounded. Medium plasticity and toughness. High dry strength. Hard. Unsorted. Has a weak layered appearance with color variation. Color variation may be due to incorporation of a different/underlying unit. Desiccation cracks and other weathered features like root development not observed. Moist to damp. Unweathered/slightly weathered? TILL. Underlying contact may be as high as 65.0'.		Color change is transitional and distinct. Strong reaction with HCl throughout. End 8/21/12. 1700 at 64.0'. Begin 8/22/12, 0730, 60°F, sunny. Prior to augering SS-33 added 30 gal. water. Strong reaction with HCl.	ML CL
63		SS-32	1.7	13				
				846		19		
64				23				
		845		9				
65		SS-33	1.0	14				
				844		36		
66				30	Change at 66.0'.			
		843		9	Olive gray/dark olive gray to olive (5Y 4/2, 3/2 to 4/4) SANDY CLAYEY SILT. Trace gravel, generally less than 1/2" diameter, angular to subrounded. Layered to mottled appearance. Greenish gray/dark greenish gray (10Y 5/1 to 4/1) color increasing with depth. Unsorted. High plasticity, medium to high toughness. High dry strength. Weathered to slightly weathered. TILL.		Moderate to strong reaction with HCl. Possibly ML-CL classification. Higher clay content than overlying unit. Driller noted presence of cobbles. Strong reaction with HCL. below 67.4'. 66.3' - 67.1' ~80° desiccation cracks. Faces oxidized dark brown/reddish brown. No indication of water.	CL
67		SS-34	1.7	14				
				842		23	Below 67.4' consistent greenish gray/dark greenish gray (10Y 5/1 - 4/1 to 5GY 5/1 - 4/1) color. Unweathered.	
68				60				
		841		8				
69		SS-35	1.9	10				
				840		17	At 69.5' 3/8" x 1 1/2" wood fragment. Trace black decomposition to fresh brown color.	
				40				

Page 4 of 4

Monitoring Well Installation Report

Site Name and Location: *CECOS, Aber Road Facility, Williamsburg, Ohio*

Completion Date: *8/22/12*

Coordinates: *5948.01N 8697.78E*

Borehole Depth (ft): *80.0*

Elevation Top of Casing (ft/MSL): *911.83*

Borehole Diameter (in): *8"*

Elevation Ground Surface (ft/MSL): *909.3*

Drilling Methods: *4 1/4" ID Hollow Stem Auger*

Installed By: *Mike Caprioni/Jersey West Drilling*

Completed Drilling: *8/22/12*

Supervised By: *David Sugar/Eagon & Associates, Inc.*

Drilling Water Used (gals): *111*

Well Design

Component	Materials	Depth (LSD)	Elevation
Well Protector	4" Diameter Steel with Locking Lid	-2.7 - 2.3	912.0 - 907.0
Riser	2" Diameter Schedule 40 PVC	-2.5 - 73.9	911.8 - 835.4
Surface Seal	24" Diameter Concrete	-0.5 - 2.5	909.8 - 906.8
Grout Seal	"Pure Gold" Bentonite Grout	2.5 - 69.8	906.8 - 839.5
Bentonite Seal	3/8" Bentonite Chips	69.8 - 71.8	839.5 - 837.5
Sand Pack	No. 5 "Global" Silica Sand	71.8 - 79.1	837.5 - 830.2
Screen	2" Diameter 10-Slot Schedule 40 PVC	73.9 - 78.7	835.4 - 830.6
Well Point Blank	2" Diameter Schedule 40 PVC Cap	78.7 - 79.1	830.6 - 830.2
Sand Pack Bottom	No. 5 "Global" Silica Sand	79.1 - 80.0	830.2 - 829.3

Well Development

Well Depth (ft, TOC):

81.7

Depth to Water (ft, TOC):

12.04

Well Volume (gals):

11.4

Volume Purged (gals):

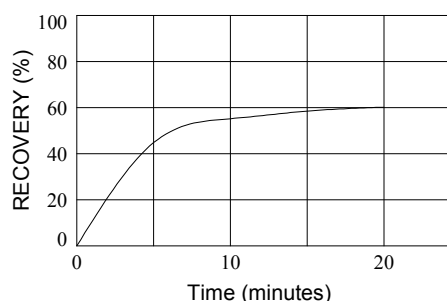
122.5

Development Method:

Surge block, bailer, whale pump

Date	Time	Cumulative Volume Removed (gals)	Temp (°C)	Specific Conductivity (µmhos/cm)	pH (S.U.)	Turbidity (NTU)
8/29/12	0945	10	-	-	-	>1000
8/29/12	1005	20	16.2	813	6.30	561.0
8/29/12	1025	30	16.0	770	6.71	56.0
8/29/12	1155	75	16.0	785	7.00	7.8
8/29/12	1355	117.5	15.9	778	7.11	6.9
8/29/12	1405	122.5	16.3	786	7.12	7.4

Recovery Data



Sampling Equipment:

Bladder pump

Comments:

Well riser and screen are "Johnson" flush threaded sections with o-ring seals. Bentonite grout mixed to 30% specifications. Removed 63 gal of water in excess of water added during drilling and cleaning prior to setting well.

Boring depth=80.0 ft.

RECORD OF BORING NO. P-500

Client: Cecos Internation
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 1 of 3

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
912.40	0.0	Topsoil, mottled brown & gray silty clay, organics moist	1	0.0-2.0	SS	1-1-1-1	24
			2	2.0-4.0	SS	2-2-2-2	18
908.40	4.0	Mottled brown & gray sandy silty clay, trace gravel	3	4.0-6.0	SS	2-2-3-4	20
			4	6.0-8.0	SS	3-3-5-6	24
904.40	8.0	Brown-gray sandy silty clay with gravel (Till)	5	8.0-10.0	SS	12-13-14-25	24
			6	10.0-12.0	SS	25-30-40-50	24
			7	12.0-14.0	SS	37-40-41-40	24
898.40	14.0	Gray sandy clayey silt with gravel (Till)	8	14.0-16.0	SS	27-30-48-41	24
			9	16.0-18.0	SS	20-19-19-25	24
			10	18.0-20.0	SS	9-10-23-41	24
892.90	19.5	Brown fine-medium silty sand, moist	11	20.0-22.0	SS	9-12-20-24	24
890.10	22.3	Gray sandy silty clay with gravel, moist, (Till)	12	22.0-24.0	SS	9-10-25-31	24
			13	24.0-26.0	SS	15-31-50/6"	18
886.40	26.0	Gray sandy clayey silt with gravel, (Till)	14	26.0-28.0	SS	16-19-24-39	24
			15	28.0-30.0	SS	18-21-21-39	20
			16	30.0-32.0	SS	13-16-21-25	24
			17	32.0-34.0	SS	20-18-17-25	24
			18	34.0-36.0	SS	13-14-20-25	24
			19	36.0-38.0	SS	15-13-15-19	24
			20	38.0-40.0	SS	7-13-21-23	24

Dates Drilled: 5/4-8/87

Driller: Earl Dye

Water Depth: Initial:

Note: 300lb hammer used

Days after Completion:

Days after Completion:

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

RECORD OF BORING NO.

P-500

Client: Cecos International

Page: 2 of 3

Project: Hydrogeological Investigation of Cells 16-27

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
		*Perm Test Sample 40.0-41.6	21	40.0-42.0	SS	10-12-14-20	24
			22	42.0-44.0	SS	12-13-15-18	24
			23	44.0-46.0	SS	9-9-11-14	24
			24	46.0-48.0	SS	12-13-17-27	24
			25	48.0-50.0	SS	8-11-12-14	24
			26	50.0-52.0	SS	8-12-16-17	24
			27	52.0-54.0	SS	7-11-12-18	22
857.25	55.15						
		Gray silty fine-coarse	28	54.0-56.0	SS	14-14-18-23	24
		sand with gravel, wet	29	56.0-58.0	SS	21-9-19-13	24
855.05	57.35						
		Gray sandy clay silt with	30	58.0-60.0	SS	14-18-35-50	24
		gravel (Till)	31	60.0-62.0	SS	35-29-30-31	24
			32	62.0-64.0	SS	13-17-21-30	18
		1" fine sand at 61.5"	33	64.0-66.0	SS	20-24-30-34	24
			34	66.0-68.0	SS	21-30-33-50	24
			35	68.0-70.0	SS	13-27-39-43	15
			36	70.0-72.0	SS	13-29-38-44	24
			37	72.0-74.0	SS	9-19-24-40	24
			38	74.0-76.0	SS	14-16-40-50	24
			39	76.0-78.0	SS	25-30-34-50	24
			40	78.0-80.0	SS	12-15-17-25	24
			41	80.0-82.0	SS	10-13-18-25	24
			42	82.0-84.0	SS	8-12-16-25	24
			43	84.0-86.0	SS	10-15-20-25	24
			44	86.0-88.0	SS	10-15-26-22	24
			45	88.0-90.0	SS	8-12-24-22	24

Dates Drilled: 5-4-8-87

Driller: Earl Dye

Water Depth: Initial:

Days after Completion:

Note: 300lb hammer used

Days after Completion:

S&ME, INC.

Drilling Method: 4 1/2 I.D. Hollow Stem Augers

Cincinnati, Ohio

RECORD OF BORING NO. P-500

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 3 of 3

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
			46	90.0-92.0	SS	7-11-14-15	24
			47	92.0-94.0	SS	9-10-19-25	24
			48	94.0-96.0	SS	7-10-12-14	24
			49	96.0-98.0	SS	25-20-22-30	22
			50	98.0-100.0	SS	9-12-8-11	18
			51	100.0-102.0	SS	11-12-14-17	24
			52	102.0-104.0	SS	7-10-11-15	24
			53	104.0-106.0	SS	9-11-20-21	24
			54	106.0-108.0	SS	13-10-11-17	24
			55	108.0-110.0	SS	6-7-8-10	24
802.20	110.2	Gray fine sandy silt, trace gravel, moist	56	110.0-112.0	SS	2-2-3-5	24
			57	112.0-114.0	SS	2-7-9-12	24
			58	114.0-116.0	SS	7-15-31-52	20
			59	116.0-118.0	SS	50/6"	6
			60	116.5-127.0	Core	N/A	120
795.90	116.5	Interbedded gray limestone & shale (bedrock)					
		Gray clay 118.0'-119.25'					
785.40	127.0	Boring terminated at 127.0'					

Dates Drilled: 5/4-8/87

Driller: Earl Dye

Water Depth: Initial:

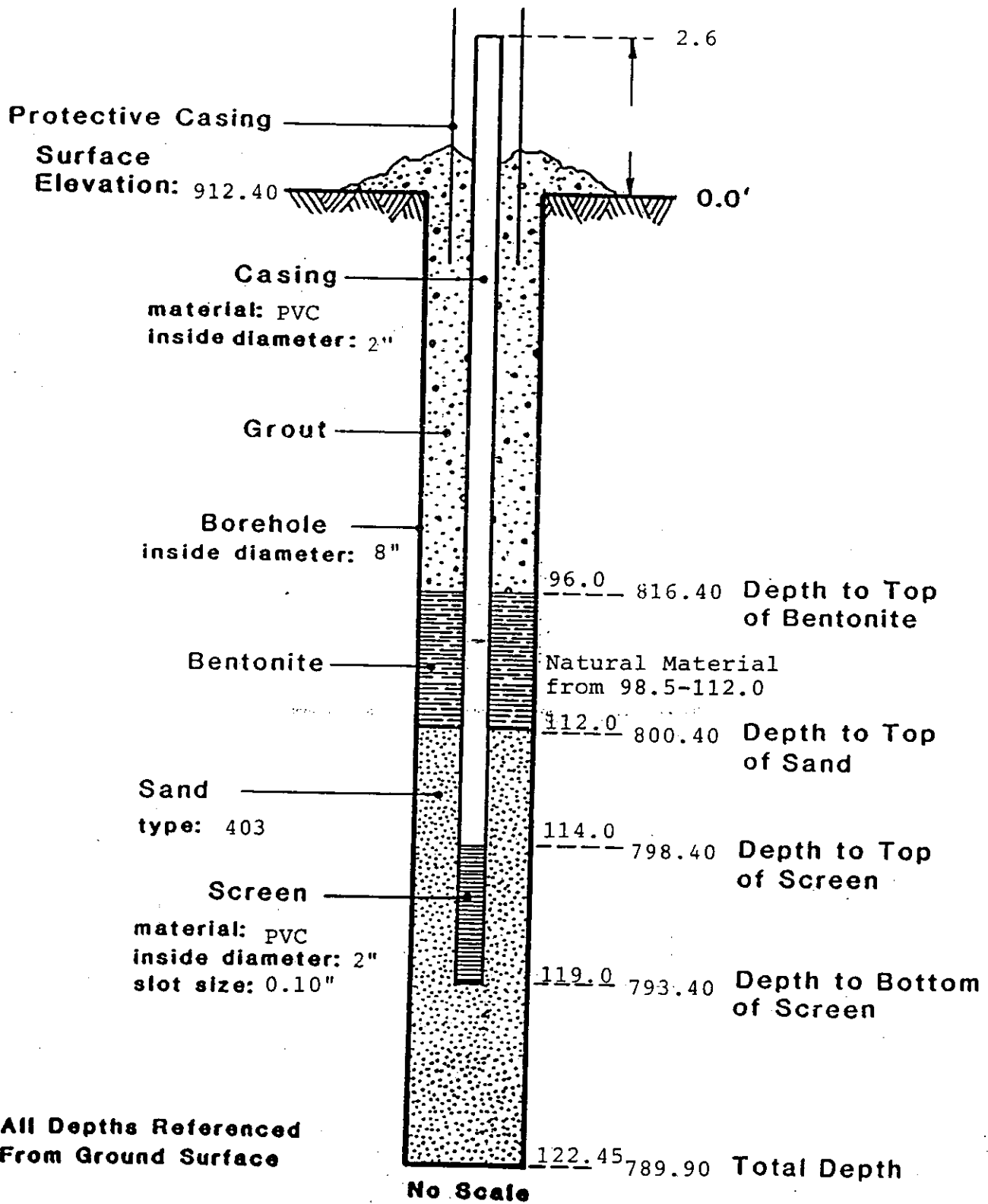
Days after Completion:

Days after Completion:

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. P-500



CECOS International
Hydrogeological Investigation Of Cells
16-27
May 10, 1987
1221-87-194

SOIL & MATERIAL ENGINEERS INC.
CINCINNATI, OHIO

RECORD OF BORING NO. P-500A

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 1 of 1

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
912.21	0.0	Augered with no sampling					
868.21	44.0	Grey sandy clayey silty with gravel (Till), dry	1	44.0-46.0	SS	10-12-14-20	24
			2	46.0-48.0	SS	13-11-13-25	24
		2" silty fine-coarse sand, wet @ 47.3'					
864.61	47.6	Grey silty fine-coarse sand and gravel, wet	3	48.0-50.0	SS	12-25-24-16	24
862.61	49.6		4	50.0-52.0	SS	10-12-20-30	20
		Grey sandy silty clay with gravel (Till), dry	5	52.0-54.0	SS	12-12-50/6"	18
			6	54.0-56.0	SS	12-13-20-26	24
856.21	56.0	Boring terminated @ 56.0'					

Dates Drilled: 6/2/87

Driller: Earl Dye

Water Depth: Initial:

Note: 300 lb hammer used

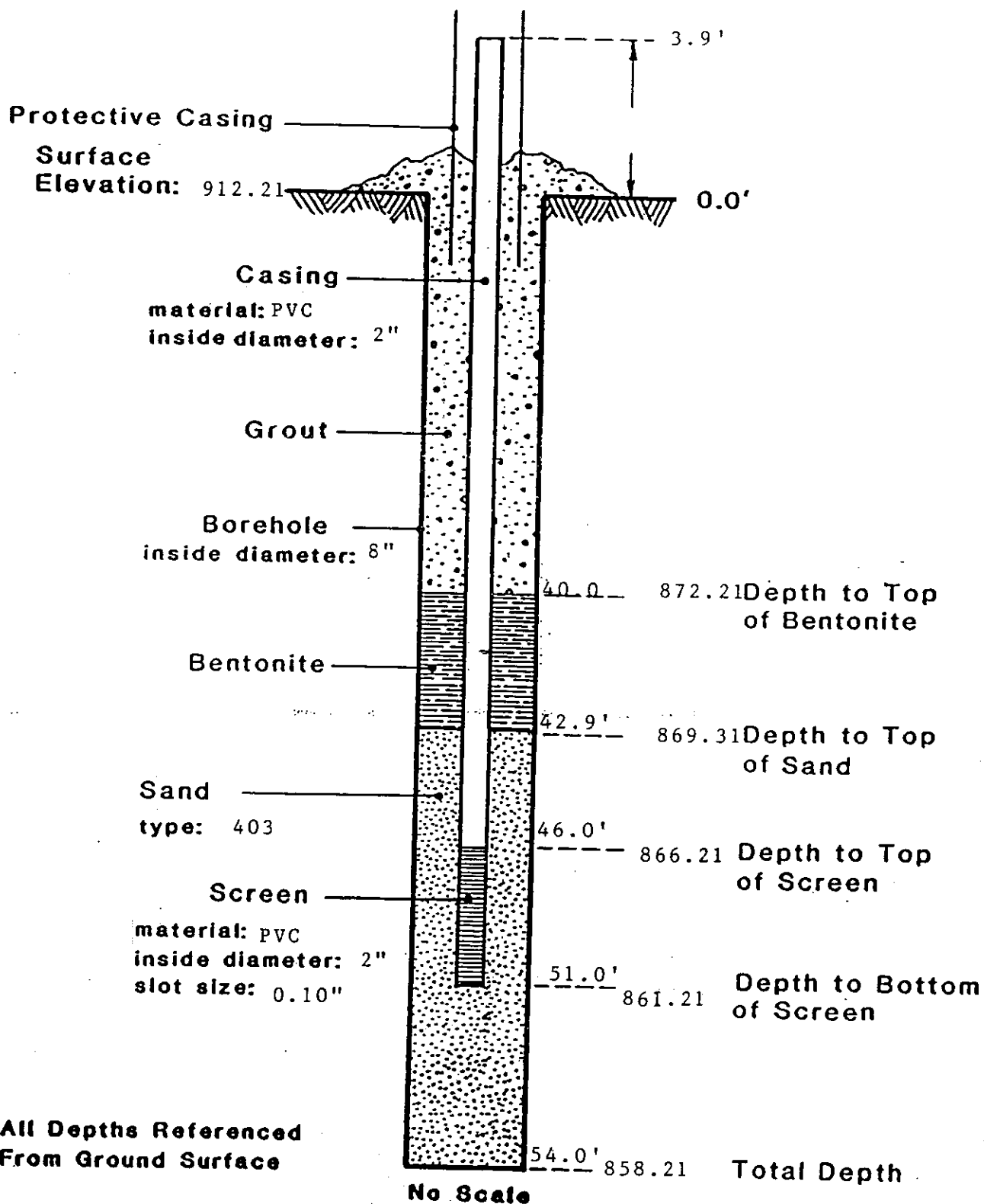
Days after Completion:

Days after Completion:

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. P-500A



CECOS International
Hydrogeological Investigation of Cells
16-27
June 2, 1987 1221-87-194

SOIL & MATERIAL ENGINEERS INC.
CINCINNATI, OHIO

RECORD OF BORING NO.

P-500B

Client: Cecos International
Project: Hydrgeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page:1 of 1

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
912.21	0.0	Augered with no sampling					
902.21	10.0	Brown sandy silty clay with gravel (Till), dry	1	10.0-12.0	SS	32-50/4"	10
		Large cobble @ 12.0'-12.5'					
899.51	12.7	Gray sandy silty clay with gravel (Till), dry	2	12.0-14.0	SS	33-40-50/6"	18
			3	14.0-16.0	SS	22-24-27-36	24
			4	16.0-18.0	SS	5-7-13-25	21
			5	18.0-20.0	SS	15-19-19-20	24
			6	20.0-22.0	SS	14-15-19-20	24
		3" fine-coarse sand @ 20.6'					
890.41	21.8	Gray silty fine sand, moist	7	22.0-24.0	SS	9-19-27-40	24
			8	24.0-26.0	SS	24-31-37-40	24
		3" gray till @ 23.8'					
886.91	25.3	Gray sandy silty clay with gravel, (Till), moist	9	26.0-28.0	SS	9-17-24-40	24
			10	28.0-30.0	SS	21-28-26-40	19
		4" silty fine sand @ 26.5'					
882.21	30.0	Boring terminated @ 30.0'					

Dates Drilled: 5/31/87

Driller: Earl Dye

Water Depth: Initial: 22'

Note: 300 lb hammer used

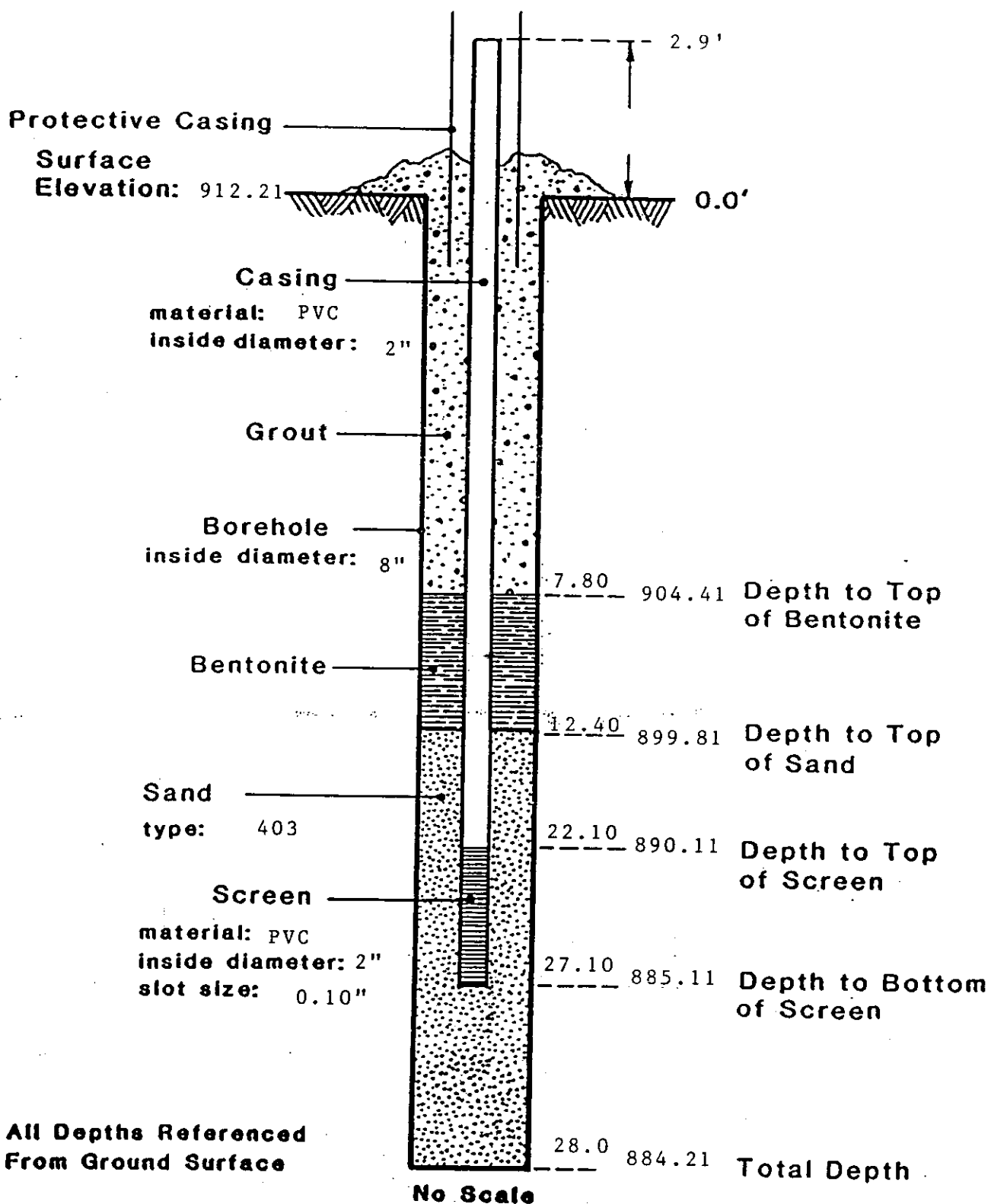
Days after Completion:

Days after Completion:

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. P-500B



CECOS International
 Hydrogeological Investigation of Cells
 16-27
 June 2, 1987
 1221-87-194

SOIL & MATERIAL ENGINEERS INC.
 CINCINNATI, OHIO

RECORD OF BORING NO.

P-501

Client: Cecos International

Page: 1 of 5

Project: Hydrogeological Investigation of Cells 16-27

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
912.00	0.0	Topsoil, Brown clayey silty with organics, moist	1	0.0-2.0	SS	2-2-2-2	24
910.0	2.0	Mottled brown & gray silty clay, trace of fine gravel moist	2	2.0-4.0	SS	2-2-3-4	19
			3	4.0-6.0	SS	6-6-7-7	24
			4	6.0-8.0	SS	6-6-6-7	24
904.3	7.7	Brown sandy clayey silty with gravel (Till), dry					
890.0	12.0	Gray sandy silty clay with gravel (Till)	5	8.0-10.0	SS	6-6-13-20	24
			6	10.0-12.0	SS	36-51-61/6"	18
			7	12.0-14.0	SS	15-21-34-33	24
			8	14.0-16.0	SS	2-4-10-17	12
			9	16.0-18.0	SS	2-8-8-12	24
895.0	17.0	Gray silty fine sand with gravel, wet	10	18.0-20.0	SS	3-6-8-10	24
891.9	18.0	Gray fine-medium sand with gravel @ 18.8"					
891.4	20.1	Gray sandy silty clay with gravel (Till)	11	20.0-22.0	SS	10-12-19-24	24
			12	22.0-24.0	SS	15-20-35-47	14

Dates Drilled: 5/6-8/87

Driller: Bernie Gollihul

Water Depth: Initial:

Days after Completion:

Note: 300lb hammer used

Days after Completion:

S&ME, INC.

Drilling Method: 4 1/2" I.D. Hollow Stem Auger

Cincinnati, Ohio

RECORD OF BORING NO. P-501

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 2 of 5

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
888.0	24.0	Gray silty fine-coarse sand & gravel, wet	13	24.0-26.0	SS	35-100/1"	7
886.3	26.0	Brown-gray sandy clayey silt with gravel, wet	14	26.0-28.0	SS	80-100/4"	10
885.6	26.4	Gray fine-medium silty sand, wet					
885.0	27.0	Gray sandy clayey silt with gravel (Till)	15	28.0-30.0	SS	65-100/6"	12
			16	30.0-32.0	SS	2-7-18-23	24
882.3	29.7	Gray silty fine-medium sand, wet	17	32.0-34.0	SS	5-7-19-41	24
887.5	34.5	Gray very fine sand & silt, wet	18	34.0-36.0	SS	7-59/6"	12
			19	36.0-38.0	SS	27-47-75/3"	15
			20	38.0-40.0	SS	8-18-90/6"	15
872.8	39.2	Gray fine-medium sand with silt & clay, trace gravel, wet	21	40.0-42.0	SS	25-50-75/6"	18
869.0	43.0	Gray silty fine sand, wet	22	42.0-44.0	SS	20-75/6"	12
		2" coarse sand & gravel @ 44.3'	23	44.0-46.0	SS	20-75/5"	11

Dates Drilled: 5/6-8/87

Driller: Bernie Gollihue

Water Depth: Initial:

Days after Completion:

Note: 300lb hammer used

Days after Completion:

S&ME, INC.

Drilling Method: 4 1/2" I.D. Hollow Stem Auger

Cincinnati, Ohio

RECORD OF BORING NO.

P-501

Client: Cecos International

Page: 3 of 5

Project: Hydrogeological Investigation of Cells 16-27

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
866.3	45.7	Gray fine-coarse sand with gravel, wet	24	46.0-48.0	SS	30-82/6"	
864.2	47.8	Gray sandy silty clay with gravel (Till)	25	48.0-50.0	SS	12-15-23-32	24
			26	50.0-52.0	SS	7-13-19-26	21
			27	52.0-54.0	SS	10-12-15-23	24
			28	54.0-56.0	SS	10-16-25-35	24
			29	56.0-58.0	SS	5-7-15-25	22
			30	58.0-60.0	SS	15-21-24-32	24
			31	60.0-62.0	SS	13-17-39-71	24
			32	62.0-64.0	SS	10-17-27-48	24
			33	64.0-66.0	SS	12-17-49-89	12
		(large cobbles @66'-68')	34	66.0-68.0	SS	4-24-44-75/5"	11
			35	68.0-70.0	SS	15-27-60/6"	18
841.8	70.2	Gray fine sand & silt, wet	36	70.0-72.0	SS	54-116/6"	12
841.1	70.9	Gray sandy silty clay with gravel (Till)	37	72.0-74.0	SS	12-20-40-68	24
			38	74.0-76.0	SS	7-13-30-45	24
			39	76.0-78.0	SS	5-10-21-32	24
			40	78.0-80.0	SS	12-12-36-45	20
			41	80.0-82.0	SS	8-13-19-19	14
829.3	82.7	Gray silty fine-medium sand with gravel, wet	42	82.0-84.0	SS	8-30-27-24	14

Dates Drilled: 5/6-8/87

Driller: Bernie Gollihue

Water Depth: Initial:

Note: 300lb hammer used

Days after Completion:

Days after Completion:

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

RECORD OF BORING NO. P-501

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 4 of 5

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
828.0	84.0	Green-gray sandy silty clay with gravel (Till), moist	43 44 45	84.0-86.0 86.0-88.0 88.0-90.0	SS SS SS	3-6-13-16 7-10-10-11 6-7-8-8	24 24 24
		limestone & shale cobbles @ 86'	46	90.0-92.0	SS	4-7-9-13	24
820.2	91.8	Gray fine-medium sand & silt, moist	47	92.0-94.0	SS	4-6-10-20	24
818.0	94.0	Gray silty fine-coarse sand, wet	48 49	94.0-96.0 96.0-98.0	SS SS	3-3-12-43 7-12-43-50	24 24
813.3	98.7	Gray very silty fine-coarse sand & gravel, wet	50 51	98.0-100.0 100.0-102.0	SS SS	12-12-49-34 8-9-19-17	24 24
810.8	101.2	Green-gray sandy silty clay with gravel (Till)	52	102.0-104.0	SS	3-5-7-7	13
		5" fine-medium clayey sand @ 104'					
807.5	104.5	Blue-green sandy clayey silt with trace of gravel & organics, moist	53 54 55 56 57 58 59	104.0-106.0 106.0-108.0 108.0-110.0 110.0-112.0 112.0-114.0 114.0-116.0 116.0-118.0	SS SS SS SS SS SS SS	2-3-5-6 2-3-4-6 2-2-3-5 3-8-10-8 5-5-10-19 2-5-7-13 1-9-13-13	24 24 24 24 24 13 12

Dates Drilled: 5/6-8/87

Driller: Bernie Collihue

Water Depth: Initial:

Days after Completion: Note; 300lb hammer used

Days after Completion:

S&ME, INC.

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

Cincinnati, Ohio

RECORD OF BORING NO. P-501

Client: Cecos International

Project: Hydrogeological Investigation of Cells 16-27 PAGE 5 OF 5

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
792.0	120.0	Interbedded gray limestone & shale	60	118.0-120.0	SS	30-75/6"	6
			61	120.0-130.0	Core	N/A	120
782.0	130.0	Boring terminated @ 130.0'					

Dates Drilled: 5/6-8/87

Driller: Bernie Gollihue

Water Depth: Initial:

Days after Completion: Note: 300lb hammer used

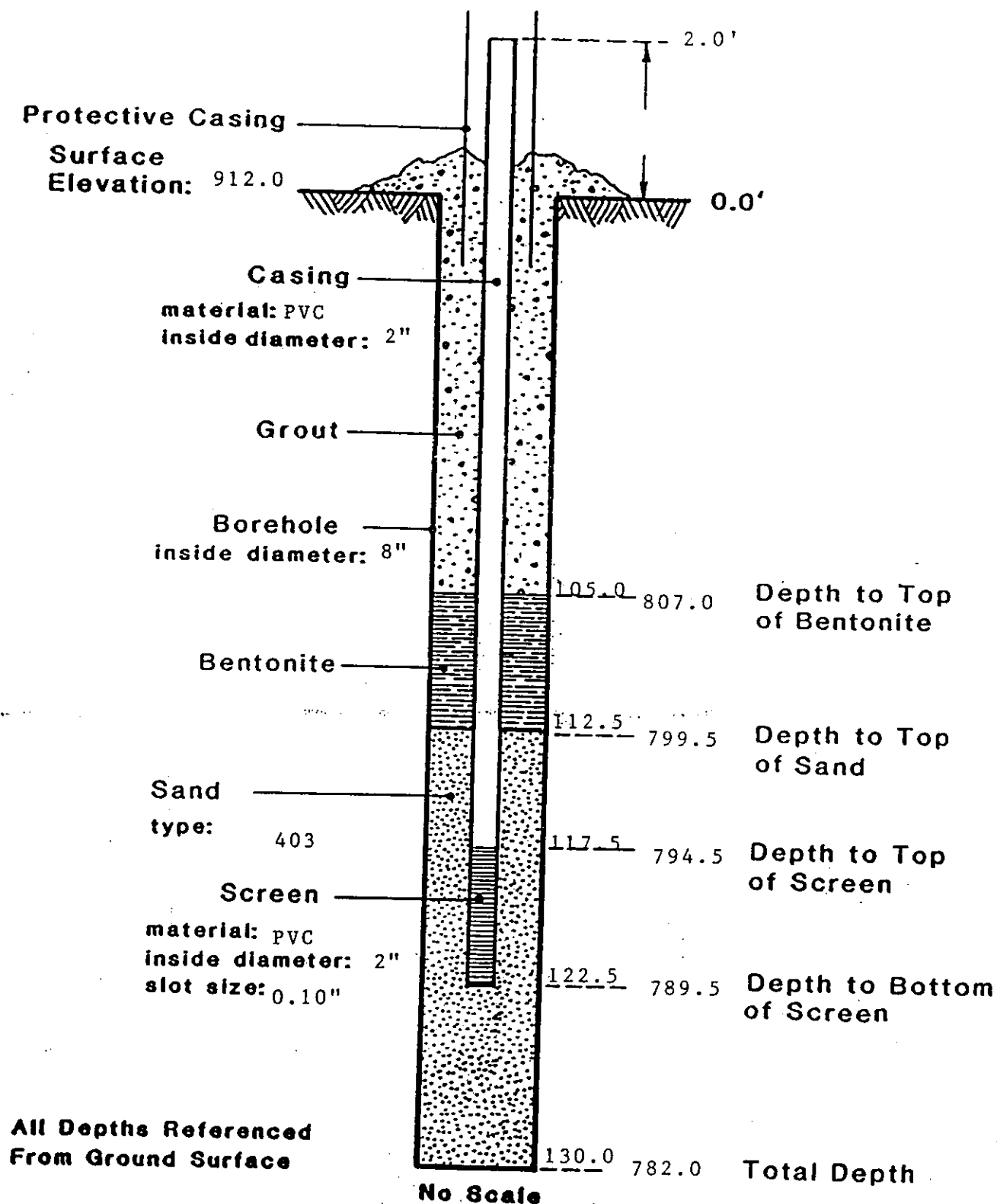
Days after Completion:

S&ME, INC.

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. P-501



CECOS International
Hydrogeological Investigation of Cells
16-27
May 9, 1987
1221-87-194

SOIL & MATERIAL ENGINEERS INC.
CINCINNATI, OHIO

RECORD OF BORING NO. P-501A

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 1 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
911.88	0.0	Augered with no sampling					
901.88	10.0	Brown sandy silty clay with gravel (Till), dry	1	10.0-12.0	SS	12-24-45-36	24
900.18	11.7	Grey sandy silty clay with gravel (Till), dry	2	12.0-14.0	SS	2-13-22-36	22
			3	14.0-16.0	SS	10-19-19-18	21
895.28	16.6	gray silty fine sand, wet	4	16.0-18.0	SS	10-17-28-18	24
			5	18.0-20.0	SS	10-15-21-23	24
			6	20.0-22.0	SS	8-17-27-37	24
		Coarse sand @ 19.0'					
890.88	21.0	Grey sandy clayey silt with gravel (Till), dry	7	22.0-24.0	SS	10-14-27-39	12
			8	24.0-26.0	SS	25-65/6"	6
			9	26.0-28.0	SS	30-70/6"	12
			10	28.0-30.0	SS	16-60/54/2"	14
881.78	30.1	Grey silty fine-coarse sand, wet	11	30.0-32.0	SS	24-30-47-36	18
			12	32.0-34.0	SS	8-22-32-63	24
		Becomes silty very fine sand @ 33.0'	13	34.0-36.0	SS	9-50-70/6"	18
			14	36.0-38.0	SS	8-15-30-32	18
874.88	37.0	Grey sandy silty clay with gravel (Till), dry					
873.38	38.5	Grey silty fine-medium sand, wet	15	38.0-40.0	SS	30-55/6"	12
871.58	40.3	Grey sandy silty clay with gravel (Till), moist	16	40.0-42.0	SS	30-57/6"	12
			17	42.0-44.0	SS	23-45-75/6"	18

Dates Drilled: 6-2-87

Driller: Bernie Gollihue

Water Depth: Initial:

Note: 300lb hammer used

Days after Completion:

Days after Completion:

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

S&ME, INC.

Cincinnati, Ohio

RECORD OF BORING NO.

P-501A

Client: Cecos International

Page: 2 of 2

Project: Hydrogeological Investigation of Cells 16-27

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
865.88	46.0	3" silty fine-coarse sand @ 43.0'	18	44.0-46.0	SS	25-48-80/6"	12
		Boring terminated @ 46.0'					

Dates Drilled: 6-2-87

Driller: Bernie Gollihue

Water Depth: Initial:

Note: 300lb hammer used

Days after Completion:

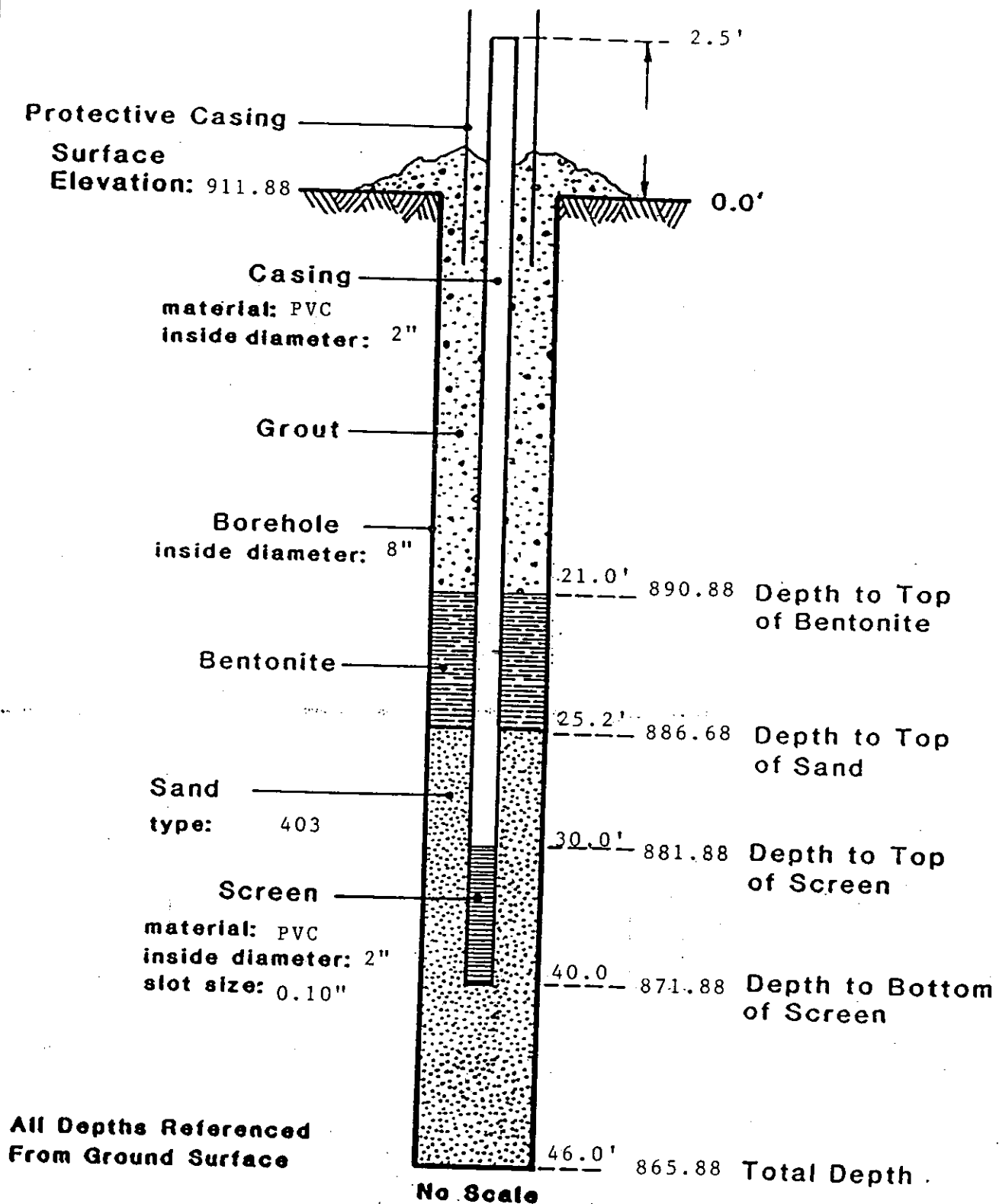
Days after Completion:

S&ME, INC.

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. P-501A



CECOS International
Hydrogeological Investigation of Cells
16-27
June 3, 1987
1221-87-194

SOIL & MATERIAL ENGINEERS INC.
CINCINNATI, OHIO

RECORD OF BORING NO.

P-503

Page: 1 of 3

Client: CECOS International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
914.30	0.0	Brown silty clay, moist	1	0.0 -2.0	SS	1-3-4-3	18
911.70	2.6	Mottled brown and gray sandy silty clay,	2	2.0- 4.0	SS	6-5-6-6	17
			3	4.0- 6.0	SS	9-14-17-18	22
			4	6.0- 8.0	SS	26-20-22-16	18
			5	8.0-10.0	SS	9-7-19-36	19
905.10	9.2	Brown sandy silty clay with gravel (Till)	6	10.0-12.0	SS	22-84-78-100	23
			7	12.0-14.0	SS	38-74-95-100	24
			8	14.0-16.0	SS	30-80-100/3"	15
898.10	16.2	Gray sandy silt with fine gravel, moist	9	16.0-18.0	SS	70-90-100/3"	15
896.30	18.0	Gray silty sand and gravel, wet	10	18.0-20.0	SS	16-17-33-51	24
895.30	19.0	Gray sandy clayey silt with gravel (Till)	11	20.0-22.0	SS	10-40-76 100/5"	19
			12	22.0-24.0		40-100/3"	9
890.80	23.5	Brown silty fine-coarse sand and gravel, wet	13	24.0-26.0	SS	63-100/4"	10
889.80	24.5	Gray sandy clayey silt with gravel (Till)	14	26.0-28.0	SS	58-40-89-100	21
			15	28.0-30.0	SS	60-135/6"	12
			16	30.0-32.0	SS	70-127/6"	12
		(1" fine sand 28.0'-28.1')					

Dates Drilled: 4/25/87 - 4/28/87

Driller: B. Gollihue

Water Depth: Initial: 18.0

Note: 380 lb. hammer used

1 Days after Completion: 28.84

Days after Completion:

Drilling Method: 3 1/4" I.D. Hollow stem augers

S&ME, INC.
Cincinnati, Ohio

RECORD OF BORING NO. P-503

Client: CECOS International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 2 of 3

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
889.80	24.5		17	32.0-34.0	SS	59-147/6	12
			18	34.0-36.0	SS	46-60-97-114	24
			19	36.0-38.0	SS	7-46-76-138	22
			20	38.0-40.0	SS	41-71-100/6	18
			21	40.0-42.0	SS	40-62-66-61	24
			22	42.0-44.0	SS	20-25-48-72	24
			23	44.0-46.0	SS	28-33-89-73	24
			24	46.0-48.0	SS	47-65-79-71	24
			25	48.0-50.0	SS	20-42-55-43	24
			26	50.0-52.0	SS	18-29-38-50	24
			27	52.0-54.0	SS	21-38-69-100	24
			28	54.0-56.0	SS	22-33-41-52	24
			29	56.0-58.0	SS	35-56-100/6	18
			30	58.0-60.0	SS	15-32-42-77	24
			31	60.0-62.0	SS	11-20-18-70	24
			32	62.0-64.0	SS	9-12-14-17	24
			33	64.0-66.0	SS	9-15-30-33	18
			34	66.0-68.0	SS	20-28-30-38	24
			35	68.0-70.0	SS	14-20-22-33	24
			36	70.0-72.0	SS	6-10-18-27	24
			37	72.0-74.0	SS	12-17-24-32	21
			38	74.0-76.0	SS	11-25-33-39	24
839.30	75.0	Green-gray sandy silt, moist					
838.80	75.5	Gray silty fine-medium sand with gravel, wet	39	76.0-78.0	SS	5-25-50-55/4"	12
836.10	78.2	Gray sandy clayey silt with gravel, (Till)	40	78.0-80.0	SS	12-19-24-25	15

Dates Drilled: 4/25/87 - 4/28/87

Driller: B. Gollihue

Water Depth: Initial: 18.0

Note: 380 lb. hammer used

1 Days after Completion: 28.84

Days after Completion:

Drilling Method: 3 1/4" I.D. Hollow stem augers

S&ME, INC.
Cincinnati, Ohio

RECORD OF BORING NO. P-503

Client: Cecos International
 Project: Hydrogeological Investigation of Cells 16-27
 Project No.: 1221-87-194

Page: 3 of 3

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
		Gray sandy clayey silt with gravel (Till)	41	80.0-82.0	SS	3-6-12-50/3"	18
			42	82.0-84.0	SS	25-19-30-26	14
			43	84.0-86.0	SS	5-6-13-21	24
		(limestone cobble 88.0')	44	86.0-88.0	SS	10-13-19-20	20
			45	88.0-90.0	SS	4-8-12-16	24
		(limestone cobble 92.0')	46	90.0-92.0	SS	5-10-13-50/3"	21
			47	92.0-94.0	SS	6-10-14-21	24
			48	94.0-96.0	SS	3-5-7-11	18
			49	96.0-98.0	SS	3-6-10-11	24
			50	98.0-100.0	SS	3-3-6-10	24
			51	100.0-102.0	SS	6-9-10-11	24
		(limestone cobble 104.0')	52	102.0-104.0	SS	3-6-12-19	18
			53	104.0-106.0	SS	3-6-9-11	24
			54	106.0-108.0	SS	5-8-11-13	24
806.10	108.2						
		Gray-green sandy silty clay with gravel (Till)	55	108.0-110.0	SS	3-3-6-12	22
			56	110.0-112.0	SS	3-5-8-11	24
			57	112.0-114.0	SS	3-3-6-9	24
			58	114.0-116.0	SS	3-4-6-6	24
			59	116.0-118.0	SS	6-9-13-12	24
		(2" fine sand at 119.0' - 119.2"	60	118.0-120.0	SS	3-5-13-8	24
			61	120.0-122.0	SS	3-13-8-8	24
791.50	122.8						
		Brown silty fine-medium sand and fine gravel, wet	62	122.0-124.0	SS	2-2-10-14	24
			63	124.0-126.0	SS	33-13-54-34	24
			64	126.0-128.0	SS	73/0"	0
788.30	126.0						
		Interbedded gray shale and limestone	65	126.0-136.0	core	N/A	120
778.30	136.0	Boring terminated at 136.0'					

Dates Drilled: 4/25/87 - 4/28/87

Driller: B. Gollihue

Water Depth: Initial: 18.0

Note: 380 lb. hammer used

Days after Completion: 28.84

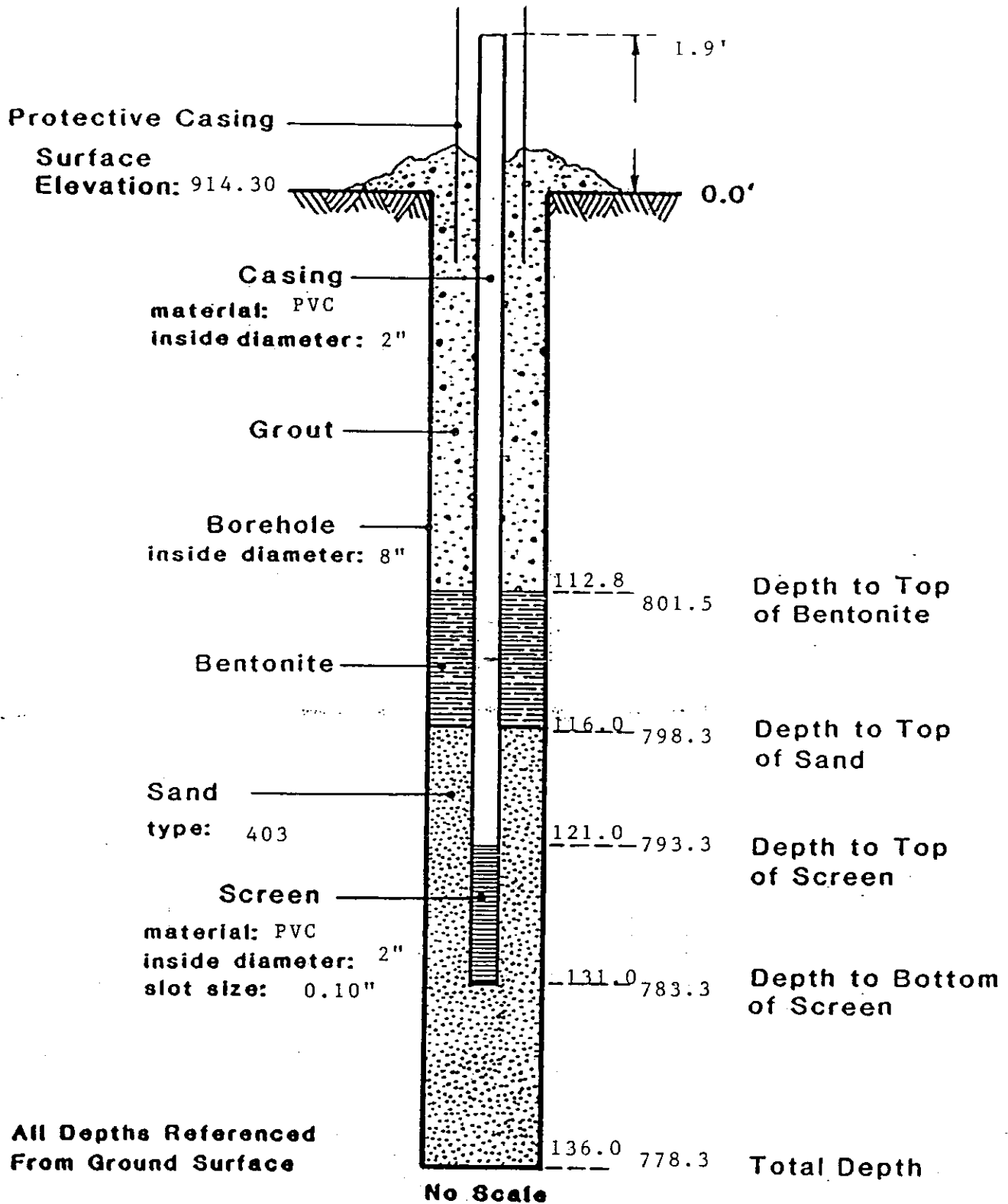
Days after Completion:

S&ME, INC.

Drilling Method: 3 1/4" I.D. Hollow stem augers

Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. P-503



CECOS International
Hydrogeological Investigation of Cells
16-27
April 29, 1987
1221-87-194

SOIL & MATERIAL ENGINEERS INC.
CINCINNATI, OHIO

RECORD OF BORING NO.

P-504

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 1 of 4

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
913.86	0.0	Topsoil, brown sandy clayey silt, organics, dry	1	0.0-2.0	SS	1-2-2-2	13
913.36	0.5	Mottled brown and gray sandy silty clay, organics moist	2 3 4	2.0-4.0 4.0-6.0 6.0-8.0	SS SS SS	2-2-3-4 3-3-4-3 5-5-4-5	24 17 24
906.76	7.1	Brown sandy silty clay with gravel, moist (Till)	5 6	8.0-10.0 10.0-12.0	SS SS	5-8-13-15 8-20-33-45	24 24
901.86	12.0	Gray sandy silty clay with gravel, dry (Till)	7 8	12.0-14.0 14.0-16.0	SS SS	48-63/6" 11-28-32-48	12 8
897.36	16.5	Brown silty fine-medium sand, wet	9	16.0-18.0	SS	23-21-24-25	22
896.36	17.5	Gray sandy clay silt with gravel, moist (Till)					
895.86	18.0	Brown silty fine-coarse sand and gravel, wet					
891.96	21.9	Gray sandy clayey silt with gravel, dry, (Till)	10 11 12	18.0-20.0 20.0-22.0 22.0-24.0	SS SS SS	9-11-15-17 15-12-21-30 48-50-68/6"	24 24 14

Dates Drilled: 5-10-13-87

Driller: Bernie Gollihue

Water Depth: Initial:

Days after Completion: Note: 300lb hammer used

Days after Completion:

S&ME, INC.

Drilling Method: 4 1/2 I.D. Hollow Stem Augers

Cincinnati, Ohio

RECORD OF BORING NO. P-504

Client: Cecos International

Page: 2 of 4

Project: Hydrogeological Investigation of Cells 16-27

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
			13	24.0-26.0	SS	75/1"	1
			14	26.0-28.0	SS	30-31-40-52	24
			15	28.0-30.0	SS	25-47-85/6"	18
			16	30.0-32.0	SS	25-70/6"	12
			17	32.0-34.0	SS	75/6"	6
			18	34.0-36.0	SS	22-75/6"	12
		2" very sandy clayey silt, wet @ 38.0'	19	36.0-38.0	SS	23-75/6"	12
			20	38.0-40.0	SS	27-80/6"	12
			21	40.0-42.0	SS	30-23-75/2"	14
			22	42.0-44.0	SS	15-23-89/6"	18
			23	44.0-46.0	SS	12-31-42-43	24
			24	46.0-48.0	SS	13-14-37-40	24
		2" fine-medium silty sand, wet @ 48.0'	25	48.0-50.0	SS	19-31-45-60	24
			26	50.0-52.0	SS	15-16-30-42	24
861.86	52.0	Brown fine-medium silty sand, wet	27	52.0-54.0	SS	22-40-75/6"	18
861.16	52.7	Gray sandy clayey silt with gravel, moist (Till)	28	54.0-56.0	SS	31-54/6"	10
			29	56.0-58.0	SS	11-30-31-42	24
			30	58.0-60.0	SS	20-30-45-57	24
		4" fine-coarse silty sand, wet @ 54.0'	31	60.0-62.0	SS	15-16-27-32	24
			32	62.0-64.0	SS	12-23-23-26	24
			33	64.0-66.0	SS	7-9-15-30	12
		5" limestone cobble @ 54.3'	34	66.0-68.0	SS	9-13-30-53	15

Dates Drilled: 5/10-13/87

Driller: Bernie Gollihue

Water Depth: Initial:

Days after Completion: Note: 300lb hammer used

Days after Completion:

S&ME, INC.

Drilling Method: 4 1/2" Hollow Stem Auger

Cincinnati, Ohio

RECORD OF BORING NO.

P-504

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 3 of 4

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
845.36	68.5	Green-gray sandy silty clay with gravel, (Till) limestone float @ 72.5'	35	68.0-70.0	SS	17-20-33-32	12
			36	70.0-72.0	SS	7-14-63/6"	18
			37	72.0-74.0	SS	14-20-24-35	6"
			38	74.0-76.0	SS	6-10-13-13	24
			39	76.0-78.0	SS	2-6-14-26	18
			40	78.0-80.0	SS	5-10-15-26	24
			41	80.0-82.0	SS	7-12-22-23	24
			42	82.0-84.0	SS	7-10-17-17	0
			43	84.0-86.0	SS	4-8-10-13	24
			44	86.0-88.0	SS	4-6-7-7	24
			45	88.0-90.0	SS	3-4-7-9	24
			46	90.0-92.0	SS	6-8-9-13	10
			47	92.0-94.0	SS	4-6-11-12	24
			48	94.0-96.0	SS	3-6-7-13	11
			49	96.0-98.0	SS	3-3-7-10	24
			50	98.0-100.0	SS	3-6-12-19	24
814.56	99.3	Gray sandy silty clay with gravel and blue-green shale fragments, organic, (Till)	51	100.0-102.0	SS	10-14-17-14	24
811.86	102.0	No samples-void or soft sands encountered	N/A	102.0-105.0	None	Free Fall	0
808.86	105.0	Gray silty fine-medium sand with gravel, wet	52	105.0-107.0	SS	5-8-17-24	24
			53	107.0-109.0	SS	2-3-7-9	24
			54	109.0-111.0	SS	2-1-3-9	24

Dates Drilled: 5/10-13/87

Driller: Bernie Collihue

Water Depth: Initial:

Days after Completion:

Days after Completion: Note: 300lb hammer used

S&ME, INC.

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

Cincinnati, Ohio

RECORD OF BORING NO.

P-504

Client: Cecos International

Page: 4 of 4

Project: Hydrogeological Investigation of Cells 16-27

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
803.16	110.7	Blue-green silty clay with limestone fragments & shale	55	111.0-113.0	SS	12-38-60/3"	9
801..36	112.5	Interbedded gray limestone and shale	56	112.5-122.5	Core	N/A	120
791.36	122.5	Boring terminated @ 122.5'					

Dates Drilled: 5/10-13/87

Driller: Bernie Gollihue

Water Depth: Initial:

Days after Completion: Note: 300lb hammer used

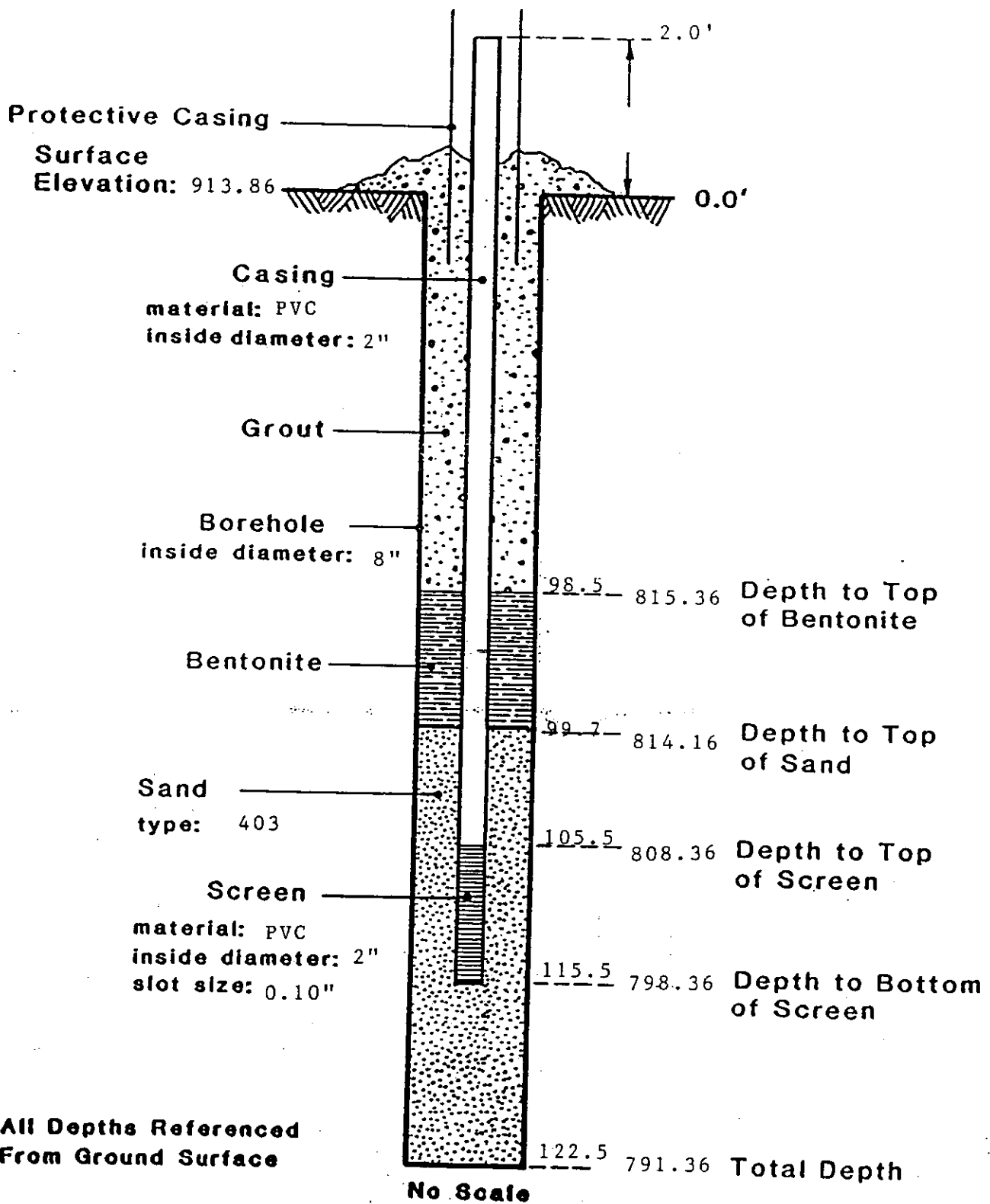
Days after Completion:

S&ME, INC.

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. P-504



CECOS International
Hydrogeological Investigation of Cells
16-27
May 18, 1987
1221-87-194

SOIL & MATERIAL ENGINEERS INC.
CINCINNATI, OHIO

RECORD OF BORING NO. P-505

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 1 of 3

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
914.30	0.0	Topsoil, brown sandy silty clay with organics, dry	1	0.0-2.0	SS	1-1-1-1	20
			2	2.0-4.0	SS	2-2-2-4	24
909.80	4.5	Mottled brown & gray silty clay with black organics, moist	3	4.0-6.0	SS	2-2-3-4	24
			4	6.0-8.0	SS	4-6-5-8	24
905.40	8.9	Brown sandy silty clay with gravel, dry (Till)	5	8.0-10.0	SS	5-5-12-16	24
			6	10.0-12.0	SS	25-30-36-50	24
			7	12.0-14.0	SS	24-25-50/5"	15
			8	14.0-16.0	SS	25-19-30-40	24
			9	16.0-18.0	SS	12-15-20-26	24
			10	18.0-20.0	SS	12-17-21-24	24
894.1	20.2	Brown silty fine sand wet	11	20.0-22.0	SS	18-35-45-50	24
			12	22.0-24.0	SS	33-26-45-50	24
			13	24.0-26.0	SS	17-17-46-50	24
888.5	25.8	Brown-gray sandy silty clay with gravel, dry (Till)	14	26.0-28.0	SS	18-29-32-50	24
			15	28.0-30.0	SS	35-42-50/3	15
			16	30.0-32.0	SS	35-50/4"	10
			17	32.0-34.0	SS	36-42-50/1"	13
			18	34.0-36.0	SS	15-29-43-35	24
			19	36.0-38.0	SS	16-24-24-30	24
			20	38.0-40.0	SS	19-20-21-22	24
			21	40.0-42.0	SS	16-19-20-25	24
			22	42.0-44.0	SS	15-16-22-30	24
			23	44.0-46.0	SS	18-18-18-22	24
			24	46.0-48.0	SS	12-14-19-27	22
			25	48.0-50.0	SS	16-18-26-30	24

Dates Drilled: 5/11/87 & 5/19/87

Driller: Earl Dye

Water Depth: Initial:

Days after Completion: Note: 300lb hammer used

Days after Completion:

S&ME, INC.

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

Cincinnati, Ohio

RECORD OF BORING NO. P-505

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 2 of 3

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
862.5	51.8	Brown silty fine-coarse sand, wet	26	50.0-52.0	SS	13-16-17-50	24
862.0	52.3	Gray sandy clayey silt with gravel, dry, (Till)	27	52.0-54.0	SS	7-20-22-23	24
			28	54.0-56.0	SS	13-18-25-35	24
			29	56.0-58.0	SS	6-9-20-24	24
			30	58.0-60.0	SS	5-8-14-19	20
			31	60.0-62.0	SS	10-11-15-21	24
			32	62.0-64.0	SS	5-9-13-19	24
			33	64.0-66.0	SS	9-13-21-19	24
			34	66.0-68.0	SS	12-25-27-31	24
			35	68.0-70.0	SS	5-7-8-17	24
			36	70.0-72.0	SS	12-14-16-21	24
			37	72.0-74.0	SS	6-7-10-15	24
			38	74.0-76.0	SS	5-9-10-12	24
			39	76.0-78.0	SS	3-5-10-15	24
			40	78.0-80.0	SS	8-7-10-12	24
			41	80.0-82.0	SS	6-7-11-12	24
		2" silty medium-coarse sand @ 83.8"	42	82.0-84.0	SS	6-6-11-15	24
			43	84.0-86.0	SS	21-20-50/6"	18
829.4	84.9	Gray very silty clayey fine-coarse sand, wet					
828.3	86.0	Green-gray sandy silty clayey, with gravel, organic moist (Till)	44	86.0-88.0	SS	18-20-24-27	24
			45	88.0-90.0	SS	4-6-6-10	24

Dates Drilled: 5/11/87 & 5/19/87

Driller: Earl Dye

Water Depth: Initial:

Days after Completion: Note: 300lb hammer used

Days after Completion:

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

RECORD OF BORING NO. P-505

Client: Cecos International

Page: 3 of 3

Project: Hydrogeological Investigation of Cells 16-27

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
816.5	97.8	Interbedded gray limestone and shale	46	90.0-92.0	SS	8-7-8-7	24
			47	92.0-94.0	SS	2-4-4-10	24
			48	94.0-96.0	SS	5-5-7-10	24
			49	96.0-98.0	SS	3-2-13-50	24
			50	98.0-100.0	SS	26-50/3"	8
			51	98.0-102.8		N/A	48
			52	102.8-108.0	Core	N/A	63
806.3	108.0	Boring terminated @ 108.0'					

Dates Drilled: 5/19/87

Driller: Earl Dye

Water Depth: Initial:

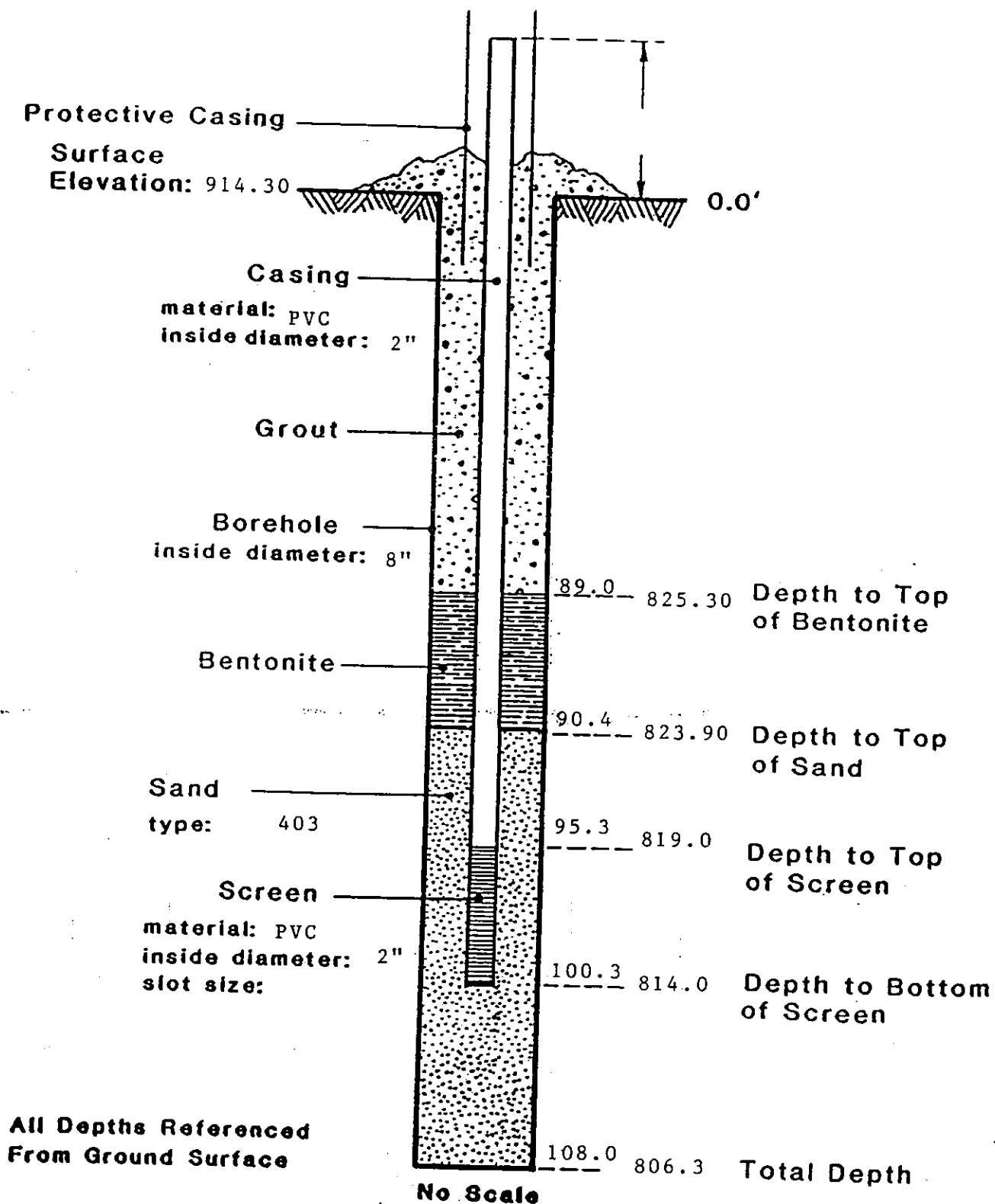
Days after Completion: Note: 300lb hammer used

Days after Completion:

S&ME, INC.

Drilling Method: 4 1/2" I.D. Hollow Stem Augers & 3" N/X Rock Core Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. P-505



CECOS International
Hydrogeological Investigation of Cells
16-27
May 19, 1987
1221-87-194

SOIL & MATERIAL ENGINEERS INC.
CINCINNATI, OHIO

RECORD OF BORING NO.

P-505A

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 1 of 1

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
914.30	0.0	Augered with no sampling					
913.30	10.0	Brown sandy silty clay	1	10.0-12.0	SS	16-30-50/6"	18
		with gravel (Till, dry)	2	12.0-14.0	SS	17-30-35-40	24
909.2	14.1	Gray sandy silty clay with	3	14.0-16.0	SS	15-17-27-40	24
		gravel (Till, dry)	4	16.0-18.0	SS	17-21-31-40	24
			5	18.0-20.0	SS	17-19-21-40	24
		2" gray fine-medium sand @ 17.8'					
903.6	19.7	Gray silty very fine-	6	20.0-22.0	SS	11-13-17-21	24
		medium sand, wet	7	22.0-24.0	SS	11-12-15-24	24
			8	24.0-26.0	SS	9-27-28-50	24
		Coarse sand @ 22'					
887.7	25.6	Gray sandy silty clay with	9	26.0-28.0	SS	18-20-27-40	24
		gravel, dry	10	28.0-30.0	SS	12-20-27-32	24
		2" silty fine-medium sand @ 26.8"					
884.3 883.3	30.0	Boring terminated @ 30.0'					

Dates Drilled: 5/30/87

Driller: Earl Dye

Water Depth: Initial:

Days after Completion: Note: 300lb. hammer used

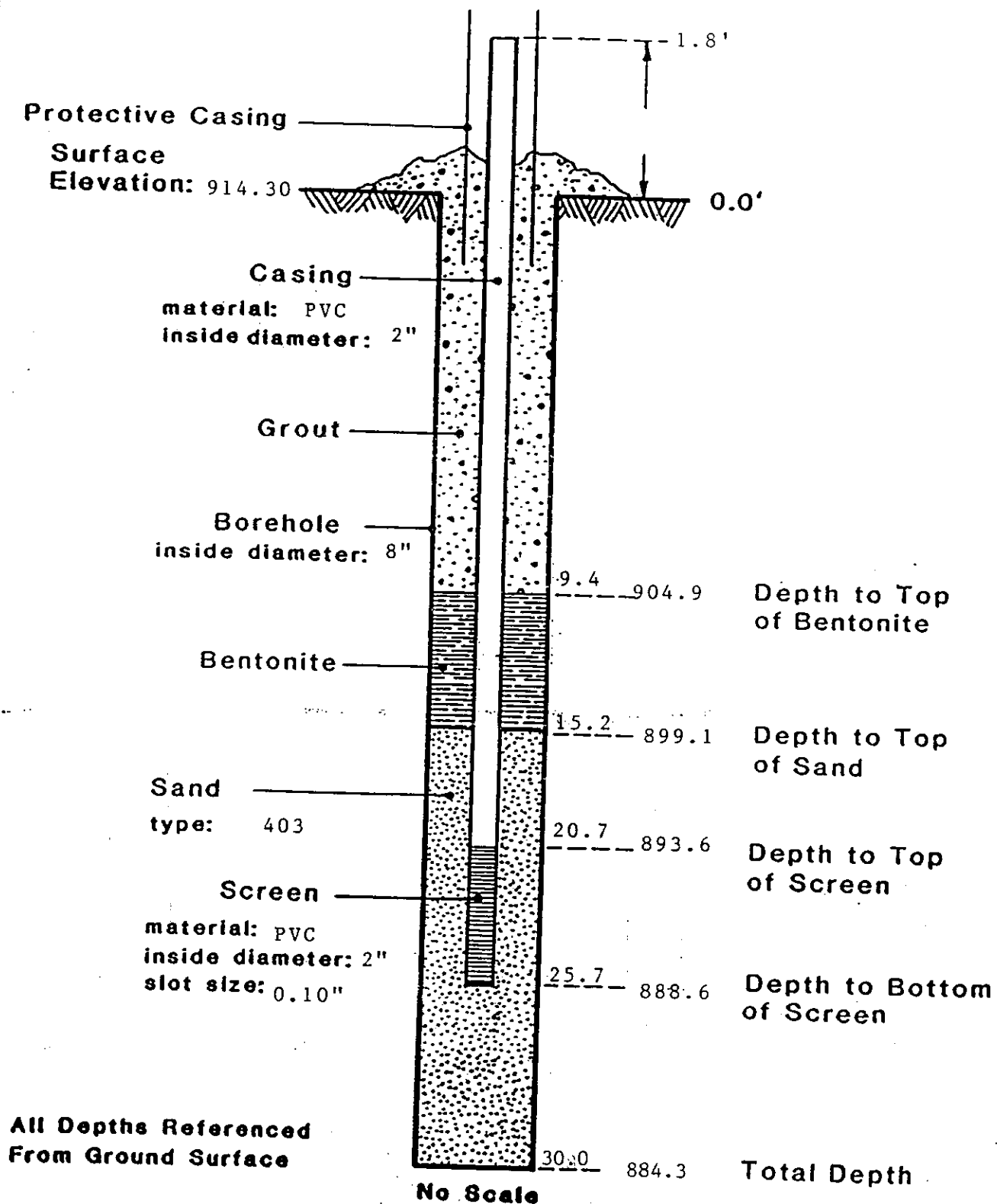
Days after Completion:

S&ME, INC.

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. P-505A



CECOS International
Hydrogeological Investigation of Cells
16-27
May 31, 1987
1221-87-194

SOIL & MATERIAL ENGINEERS INC.
CINCINNATI, OHIO

RECORD OF BORING NO.

P-506

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-26
Project No.: 1221-87-194

Page: 1 of 3

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
912.84	0.0	Topsoil, mottled brown & gray clayey silt, organics moist	1	0.0-2.0	SS	2-1-1-1	6
			2	2.0-4.0	SS	2-2-2-3	24
908.84	4.0	Mottled sandy clayey silt organics, moist	3	4.0-6.0	SS	2-2-2-4	24
			4	6.0-8.0	SS	1-2-2-2	24
904.84	8.0	Brown silty clay, moist	5	8.0-10.0	SS	2-2-2-3	24
902.84	10.0	Brown sandy silt clayey with gravel (Till) moist	6	10.0-12.0	SS	4-7-14-24	24
900.84	12.0	Gray sandy silty clay with gravel (Till), dry	7	12.0-14.0	SS	22-23-24-26	24
			8	14.0-16.0	SS	7-15-24-20	24
			9	16.0-18.0	SS	5-11-19-23	24
894.84	18.0	Gray silty fine-coarse sand, wet	10	18.0-20.0	SS	8-5-10-13	24
		1" gray sandy clayey silt @ 18.5'					
		3" gray silty fine-coarse sand and gravel @ 18.6'					
894.04	18.8	Gray sandy clayey silt with gravel (Till), moist					

Dates Drilled: 5-12-21-87

Driller: Dave Newman

Water Depth: Initial:

Days after Completion:

Note: 380lb. hammer used

Days after Completion:

S&ME, INC.

Drilling Method: 3 1/8" I.D. Hollow Stem Augers

Cincinnati, Ohio

RECORD OF BORING NO.

P-506

Client: Cecos International

Page: 2 of 3

Project: Hydrogeological Investigation of Cells 16-27

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
		3" gray silty fine-coarse sand with gravel, wet @ 20.0'	11	20.0-22.0	SS	12-12-22-24	24
			12	22.0-24.0	SS	13-15-17-18	24
			13	24.0-26.0	SS	8-12-16-22	24
			14	26.0-28.0	SS	3-6-9-12	24
			15	28.0-30.0	SS	9-10-12-12	24
882.34	30.5						
		Gray silty fine-coarse sand and gravel, wet	16	30.0-32.0	SS	8-7-34-56	24
881.94	30.9						
		Gray sandy clayey silt with gravel, (Till), moist	17	32.0-34.0	SS	32-67-54	18
			18	34.0-36.0	SS	7-32-50-70	24
878.24	34.6						
		Gray silty fine-medium sand, wet					
877.84	35.0						
		Gray sandy clayey silt with gravel (Till), moist	19	36.0-38.0	SS	19-43-62-71	24
			20	38.0-40.0	SS	22-29-37-50	24
			21	40.0-42.0	SS	14-12-25-49	24
			22	42.0-44.0	SS	9-16-22-34	24
			23	44.0-46.0	SS	12-14-18-29	24
			24	46.0-48.0	SS	3-6-18-30	24
			25	48.0-50.0	SS	10-18-23-31	24
			26	50.0-52.0	SS	7-16-20-29	24
			27	52.0-54.0	SS	16-19-29-40	24
			28	54.0-56.0	SS	15-20-33-40	24
			29	56.0-58.0	SS	6-12-19-30	24
			30	58.0-60.0	SS	12-16-23-33	24

Dates Drilled: 5/12-21/87

Driller: Dave Newman

Water Depth: Initial:

Days after Completion:

Note: 380lb hammer used

Days after Completion:

S&ME, INC.

Drilling Method: 3 1/8" I.D. Hollow Stem Augers

Cincinnati, Ohio

RECORD OF BORING NO.

P-506

Client: Cecos International

Page: 3 of 3

Project: Hydrogeological Investigation of Cells 16-27

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
			31	60.0-62.0	SS	8-15-21-27	24
			32	62.0-64.0	SS	30-70-54-60	24
			33	64.0-66.0	SS	6-15-18-28	24
			34	66.0-68.0	SS	3-6-17-28	18
			35	68.0-70.0	SS	7-11-17-22	24
			36	70.0-72.0	SS	6-12-18-30	18
			37	72.0-74.0	SS	9-15-21-26	24
			38	74.0-76.0	SS	5-6-16-20	24
			39	76.0-78.0	SS	5-5-16-21	24
835.84	77.0	Gray-green clayey silt with gravel, organics, moist, (Till)	40	78.0-80.0	SS	24-21-14-27	6
832.84	80.0	Blue-green silty clay with shale fragments, (weathered bedrock)	41	80.0-82.0	SS	70/1"	1
			42	82.0-84.0	SS	92/1"	0
830.84	82.0	Interbedded gray shale and limestone	43	82.0-92.0	Core	N/A	120
820.84	92.0	Boring terminated @ 92.0'					

Dates Drilled: 5/12-21/87

Driller: Dave Newman

Water Depth: Initial:

Days after Completion:

Note: 380lb. hammer used

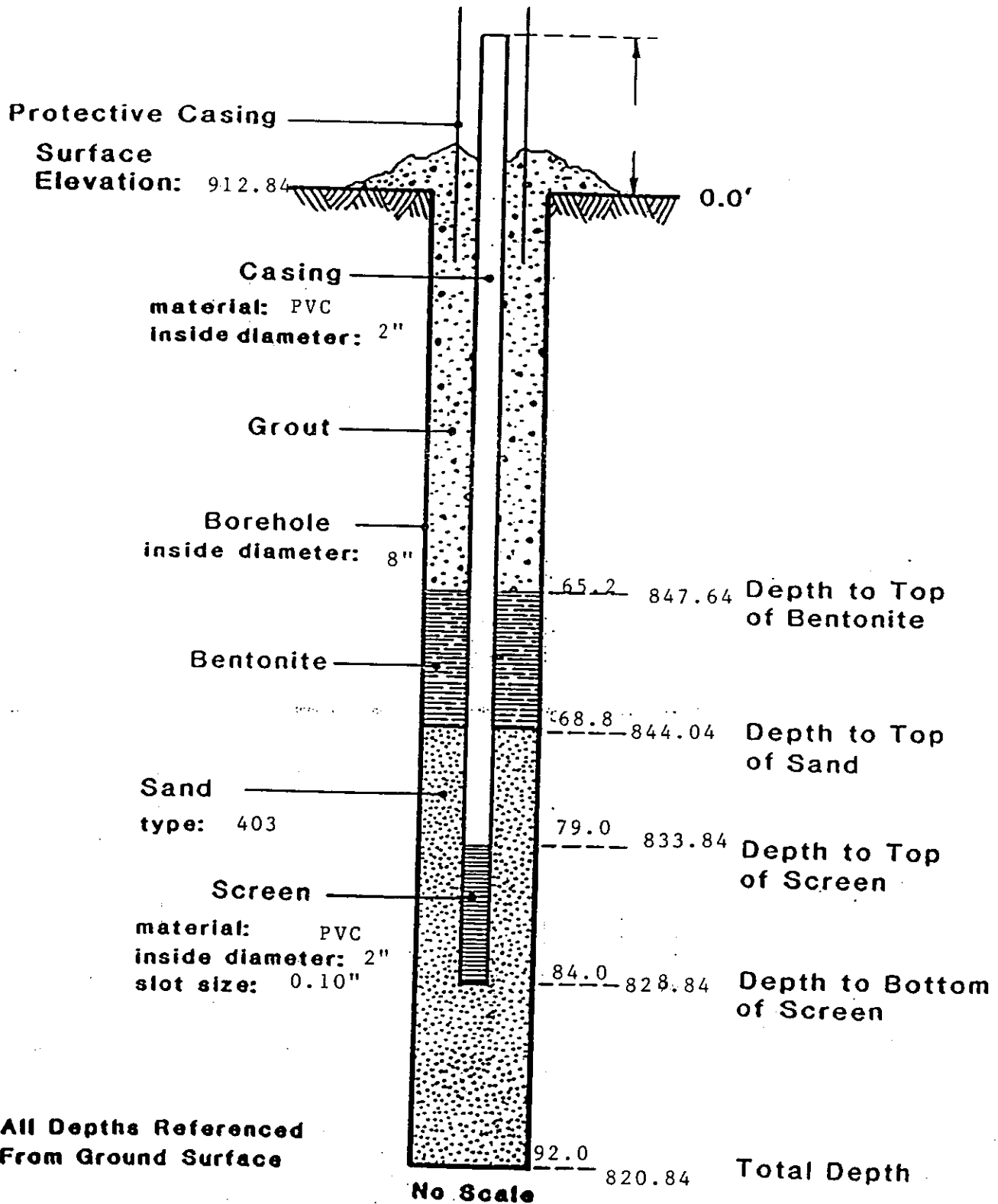
Days after Completion:

S&ME, INC.

Drilling Method: 3 1/8" I.D. Hollow Stem Augers

Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. P-506



CECOS International
Hydrogeological Investigation of Cells
16-27
May 21, 1987

SOIL & MATERIAL ENGINEERS INC.
CINCINNATI, OHIO

RECORD OF BORING NO.

P-508

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 1 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
911.13	0.0	Topsoil, brown sandy silty clay organics, moist	1	0.0-2.0	SS	2-3-4-5	20
908.33	2.8	Mottled brown and gray silty clay, moist	2	2.0-4.0	SS	3-4-4-4	20
			3	4.0-6.0	SS	4-4-5-4	24
			4	6.0-8.0	SS	3-5-4-5	24
903.53	7.6	Brown sandy silty clay with gravel, (Till), dry	5	8.0-10.0	SS	4-7-10-23	24
		limestone float @ 12.8'	6	10.0-12.0	SS	8-16-21-30	24
			7	12.0-14.0	SS	53-85/4"	10
897.13	14.0	Gray sandy silty clay with gravel (Till), dry	8	14.0-16.0	SS	14-16-23-26	24
			9	16.0-18.0	SS	15-16-29-34	20
			10	18.0-20.0	SS	15-40-33-55	24
			11	20.0-22.0	SS	11-12-12-23	24
			12	22.0-24.0	SS	10-16-19-23	24
			13	24.0-26.0	SS	10-13-17-17	24
			14	26.0-28.0	SS	4-8-17-19	12
884.03	27.9	Gray silty fine-coarse sand with gravel, wet	15	28.0-30.0	SS	4-12-15-17	12
			16	30.0-32.0	SS	11-10-19-45	22
879.93	31.2	Gray sandy clayey silt with gavel (Till), moist	17	32.0-34.0	SS	24-36-38-52	24
			18	34.0-36.0	SS	12-33-75/6"	18
			19	36.0-38.0	SS	54-75/6"	12
			20	38.0-40.0	SS	24-47-81/6"	18
			21	40.0-42.0	SS	24-61-78/6"	18
			22	42.0-44.0	SS	27-53/6"	12

Dates Drilled: 5/27/87

Driller: Bernie Collihue

Water Depth: Initial:

Days after Completion:

Note: 300lb hammer usefd

Days after Completion:

S&ME, INC.

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

Cincinnati, Ohio

RECORD OF BORING NO.

P-508

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 2 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
866.83	44.3	Gray silty fine-coarse sand, wet	23	44.0-46.0	SS	75/6"	6
865.13	46.0	Gray sandy silty clay with gavel (Till), dry	24	46.0-48.0	SS	20-45-70/6"	18
			25	48.0-50.0	SS	12-50-80/6"	18
			26	50.0-52.0	SS	23-47-63/6"	18
			27	52.0-54.0	SS	17-20-42-58	24
			28	54.0-56.0	SS	20-35-45-52	24
			29	56.0-58.0	SS	12-25-70/6"	15
852.53	58.6	Gray weathered shale with limestone fragments	30	58.0-60.0	SS	37-74/3"	9
			31	60.0-62.0	SS	35-80/6"	12
850.13	61.0	Interbedded gray limestone and shale (bedrock)	32	61.0-71.0	Core	N/A	120
840.13	71.0	Boring terminated @ 71.0'					

Dates Drilled: 5/27/87

Driller: Bernie Gollihue

Water Depth: Initial:

Note: 300lb hammer used

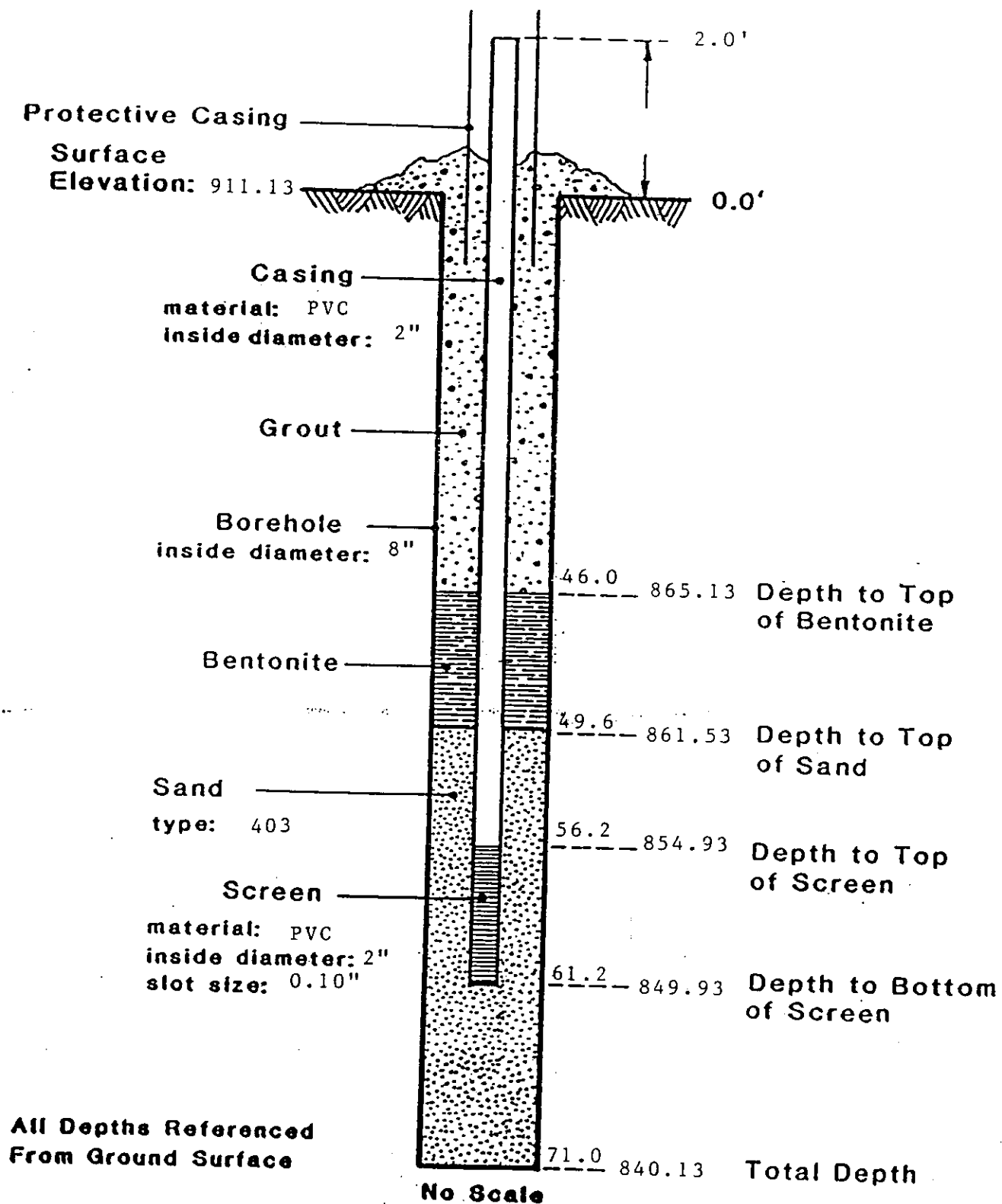
Days after Completion:

Days after Completion:

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. P-508



CECOS International
Hydrogeological Investigation of Cells
16-27
May 26, 1987
1221-87-194

SOIL & MATERIAL ENGINEERS INC.
CINCINNATI, OHIO

RECORD OF BORING NO.

P-509

Client: Cecos International

Page: 1 of 2

Project: Hydrogeological Investigation of Cells 16-27

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
908.21	0.0	Topsoil, brown sandy clay, organics, moist	1	0.0-2.0	SS	1-2-1-1	22
			2	2.0-4.0	SS	1-1-1-1	22
904.21	4.0	Mottled brown and gray sandy silty clay, organics, moist	3	4.0-6.0	SS	3-2-1-2	22
901.81	6.4	Brown sandy silty clay with gravel, (Till), dry	4	6.0-8.0	SS	5-10-17-20	24
			5	8.0-10.0	SS	15-30-34-50	23
897.11	10.1	Gray sandy clayey silt with gravel, (Till), dry	6	10.0-12.0	SS	16-23-25-24	24
896.11	11.1	Gray silty fine-medium sand, wet					
895.71	11.5	Gray sandy silty clay with gravel, (Till)	7	12.0-14.0	SS	10-21-15-15	24
			8	14.0-16.0	SS	8-20-21-16	24
			9	16.0-18.0	SS	17-18-21-23	24
			10	18.0-20.0	SS	8-8-11-15	24
			11	20.0-22.0	SS	10-11-16-17	17
			12	22.0-24.0	SS	8-8-13-30	24
883.61	23.6	Gray silty medium-coarse sand, wet	13	24.0-26.0	SS	6-12-14-16	24
			14	26.0-28.0	SS	3-11-13-17	24
			15	28.0-30.0	SS	7-7-30-50	24
877.61	29.6	Gray sandy silty clay with gravel (Till), dry					

Dates Drilled: 5/26-27-28/87

Driller: Earl Dye

Water Depth: Initial:

Note: 300lb hammer used

Days after Completion:

Days after Completion:

S&ME, INC.

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

Cincinnati, Ohio

RECORD OF BORING NO.

P-509

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 2 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
			16	30.0-32.0	SS	50/6"	6
			17	32.0-34.0	SS	33-50/4"	10
			18	34.0-36.0	SS	39-50/4"	10
			19	36.0-38.0	SS	30-50/3"	9
			20	38.0-40.0	SS	36-50/3"	9
			21	40.0-42.0	SS	41-50/4"	10
			22	42.0-44.0	SS	50/6"	6
			23	44.0-46.0	SS	29-40-50/6"	18
			24	46.0-48.0	SS	40-50/2"	8
			25	48.0-50.0	SS	36-50/2"	8
			26	50.0-52.0	SS	50/5"	5
			27	52.0-54.0	SS	40-40-50/6"	18
			28	54.0-56.0	SS	50/5"	5
			29	56.0-58.0	SS	50/2"	2
850.61	56.6	Gray sandy silty clay with gravel (Till), dry	30	56.6-60.0	SS	N/A	36
			31	60.0-62.0	SS	N/A	0
845.21	62.0	Blue-gray silty sand, ~ trace of gravel, moist	32	62.0-64.0	SS	10-10-12-17	20
			33	64.0-66.0	SS	10-11-12-25	24
839.71	67.5	Interbedded gray limestone and shale	34	66.0-68.0	SS	8-15-50/6"	18
			35	65.7-77.0	Core	N/A	114
830.21	77.0	Boring terminated @ 77.0 ft.					

Dates Drilled: 5/27-29/87

Driller: Earl Dye

Water Depth: Initial:

Days after Completion:

Days after Completion:

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

S&ME, INC.

Cincinnati, Ohio

P-509



CECOS International
Hydrogeological Investigation of Cells
16-27
May 30, 1987
1221-87-194

SOIL & MATERIAL ENGINEERS INC.
CINCINNATI, OHIO

RECORD OF BORING NO.

P-510

Page: 1 of 2

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
911.59	0.0	Topsoil, brown silty clay organics, moist	1	0.0-2.0	SS	2-2-2-3	24
909.79	1.8	Mottled brown and gray sandy silty clay, organics moist	2	2.0-4.0	SS	1-2-3-2	17
			3	4.0-6.0	SS	2-4-5-4	24
906.39	5.2	Dark brown and gray sandy silty clay, moist					
905.59	6.0	Mottled brown and gray sandy silty clay, moist	4	6.0-8.0	SS	6-10-8-6	24
902.79	8.8	Brown sandy silty clay with gravel (Till), dry	5	8.0-10.0	SS	6-6-7-15	24
			6	10.0-12.0	SS	12-27-34-27	24
			7	12.0-14.0	SS	4-9-24-28	14
898.39	13.1	Gray sandy silty clay with gravel (Till), dry	8	14.0-16.0	SS	5-8-12-12	21
			9	16.0-18.0	SS	4-5-13-16	24
894.09	17.5	Gray silty fine sand, wet	10	18.0-20.0	SS	10-22-34-21	24
893.09	18.5	Gray sandy silty clay with gravel, (Till), dry					

Dates Drilled: 5-17-19-87

Driller: Bernie Collihue

Water Depth: Initial:

Days after Completion:

Note: 300 lb. hammer used

Days after Completion:

S&ME, INC.

Drilling Method: 4 1/2 I.D. Hollow Stem Augers

Cincinnati, Ohio

RECORD OF BORING NO.

P-510

Client: Cecos International

Page: 2 of 2

Project: Hydrogeological Investigation of Cells 16-27

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
881.59	30.0	0.5" fine sand @ 19.5'	11	20.0-22.0	SS	10-21-75/6"	18
			12	22.0-24.0	SS	20-52-75/5"	17
			13*	24.0-26.0	SS	15-30-85/5"	17
		2" fine-medium sand @ 21.1'	14	26.0-28.0	SS	6-35-75/6"	18
			15	28.0-30.0	SS	26-46-75/6"	18
	36.0	Gray sandy clayey silt with gravel, (Till), moist	16	30.0-32.0	SS	7-20-28-55	24
			17	32.0-34.0	SS	45-75/6"	12
			18	34.0-36.0	SS	18-34-35-36	24
		Limestone float @ 51.0'	19	36.0-38.0	SS	6-18-24-27	24
			20	38.0-40.0	SS	12-16-28-34	24
21	40.0-42.0		SS	10-24-28-32	24		
22	42.0-44.0		SS	7-34-75/6"	18		
23	44.0-46.0		SS	12-19-23-34	24		
24	46.0-48.0		SS	9-11-34-35	24		
25	48.0-50.0		SS	18-27-43-55	24		
851.59	60.0	Interbedded gray limestone and shale	26	50.0-52.0	SS	23-45-55-41	21
			27	52.0-54.0	SS	53-60-54-56	6
			28	54.0-56.0	SS	13-23-38-45	24
			29	56.0-58.0	SS	9-10-23-30	18
			30	58.0-60.0	SS	8-50/3"	9
841.59	70.0	Interbedded gray limestone and shale	31	60.0-62.0	SS	50/0	0
			32	60.0-70.0	Core	120	
Boring terminated @ 70.0'							

Dates Drilled: 5/17-19/87

Driller: Bernie Gollihue

Water Depth: Initial:

Note: 300lb hammer used

Days after Completion:

*Approx. 3 gallons of water added

Days after Completion:

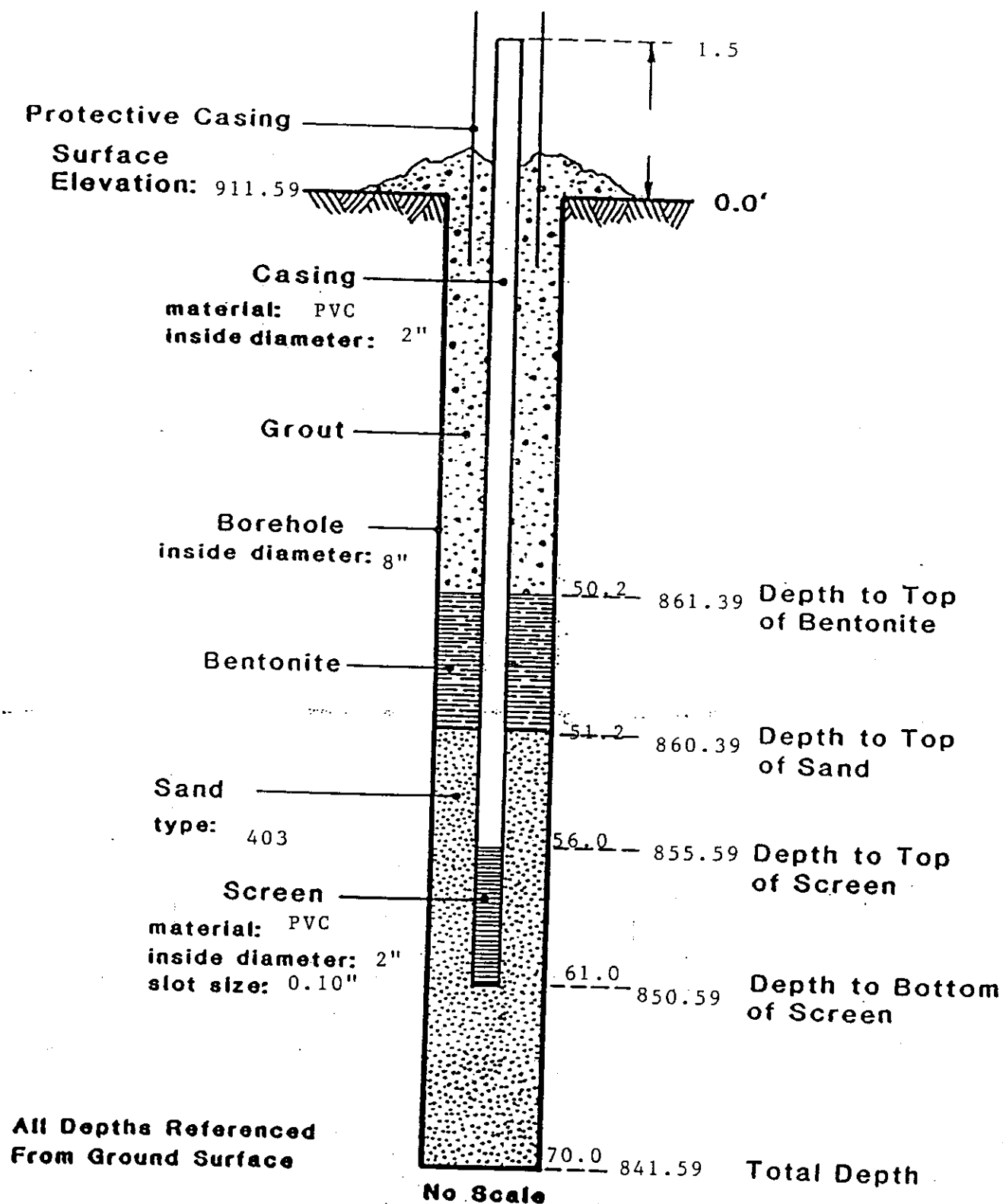
to hole.

S&ME, INC.

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. P-510



CECOS International
Hydrogeological Investigation of Cells
16-27
May 19, 1987
1221-87-194

SOIL & MATERIAL ENGINEERS INC.
CINCINNATI, OHIO

RECORD OF BORING NO.

P-511

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 1 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
910.81	0.0	Topsoil, mottled brown and gray silty clay with organics, moist	1	0.0-2.0	SS	1-1-1-1	24
			2	2.0-4.0	SS	2-2-3-2	24
			3	4.0-6.0	SS	2-2-3-3	24
			4	6.0-8.0	SS	2-2-3-4	24
			5	8.0-10.0	SS	1-3-4-15	24
902.21	8.6	Brown-gray sandy silty clay with gravel (Till), moist	6	10.0-12.0	SS	9-29-34-50	20
			7	12.0-14.0	SS	25-33-50	18
			8	14.0-16.0	SS	21-30-35-32	24
			9	16.0-18.0	SS	18-24-24-20	24
893.41	17.4	Gray sandy silty clay with gravel (Till), dry	10	18.0-20.0	SS	4-14-17-20	24
			11	20.0-22.0	SS	10-13-17-24	24
			12	22.0-24.0	SS	9-12-20-45	24
			13	24.0-26.0	SS	15-30-50	18
885.21	25.6	Gray silty fine-coarse sand with gravel, wet					
		4" gray sandy silty clay with gravel @ 26.0'					
884.51	26.3	Gray silty fine-coarse sand and gravel, wet	14	26.0-28.0	SS	14-22-25-26	24
			15	28.0-30.0	SS	3-17-22-27	24
880.81	30.0	Gray sandy silty clay with gravel (Till), moist	16	30.0-32.0	SS	27-50	0

Dates Drilled: 5/19-27/87

Driller: Earl Dye

Water Depth: Initial:

Days after Completion:

Note: 300lb hammer used

Days after Completion:

S&ME, INC.

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

Cincinnati, Ohio

RECORD OF BORING NO.

P-511

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 2 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
880.21	30.6	Gray silty fine-coarse sand with gravel, wet					
879.81	31.0	Gray sandy silty clay with gravel, (Till), dry	17	32.0-34.0	SS	35-50	10
			18	34.0-36.0	SS	22-31-50	18
			19	36.0-38.0	SS	25-30-31-33	24
			20	38.0-40.0	SS	20-20-23-27	24
			21	40.0-42.0	SS	15-15-20-30	24
			22	42.0-44.0	SS	14-19-25-23	24
			23	44.0-46.0	SS	15-35-43-45	24
			24	46.0-48.0	SS	15-30-34-54	19
			25	48.0-50.0	SS	17-23-30-50	19
			26	50.0-52.0	SS	12-28-40-50	20
			27	52.0-54.0	SS	20-25-33-38	24
			28	54.0-56.0	SS	10-20-32-50	20
			29	56.0-58.0	SS	22-30-40-50	20
			30	58.0-60.0	SS	36-24-32-31	24
			31	60.0-62.0	SS	17-29-34-37	24
			32	64.0-64.0	SS	14-20-27-30	20
			33	64.0-66.0	SS	5-8-12-15	24
			34	66.0-68.0	SS	5-10-9-15	24
			35	68.0-70.0	SS	4-7-7-8	24
			36	70.0-72.0	SS	4-6-6-9	24
			37	72.0-74.0	SS	4-7-12-14	24
			38	74.0-76.0	SS	10-23-50	18
834.81	76.0	Interbedded gray shale and limestone	39	76.0-78.0	SS	50/0"	0
			40	76.0-86.0	Core	N/A	120
824.81	86.0	Boring terminated @ 86.0'					

Dates Drilled: 5/19-27/87

Driller: Earl Dye

Water Depth: Initial:

Note: 300lb Hammer Used

Days after Completion:

Days after Completion:

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. P-511



**Surface
Elevation:** 910.81

Casing

material: PVC
inside diameter: 2"

Grout

Borehole —
inside diameter: 8"

Bentonite

Sand _____
type: 403

Screen

material: PVC
inside diameter: 2"
slot size: 0.10"

2.5'

0.0'

66.9 — 843.91 Depth to Top
of Bentonite

Natural Material
from 67.15-72
72.0 - 838.81 Depth to Top
of Sand

73.0 — 837.81 Depth to Top
of Screen

78.0 — 832.81 Depth to Bottom
of Screen

86.0 824.81 **Total Depth**

No Scale

CECOS International
Hydrogeological Investigaiton of Cells
16-27
May 27, 1987
1221-87-194

SOIL & MATERIAL ENGINEERS INC.
CINCINNATI, OHIO

RECORD OF BORING NO.

P-511A

Client: Cecos International

Page: 1 of 1

Project: Hydrogeological Investigation of Cells 16-27

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
910.81	0.0	Augered with no sampling					
896.81	14.0	Gray sandy clayey silt with gravel (Till), dry	1	14.0-16.0	SS	20-29-38-50	19
			2	16.0-18.0	SS	14-21-25-29	16
			3	18.0-20.0	SS	11-15-19-23	20
			4	20.0-22.0	SS	10-14-16-21	21
			5	22.0-24.0	SS	24-21-24-23	2
			6	24.0-26.0	SS	10-23-41-50	18
884.81	26.0	Gray silty fine-coarse sand and gravel, dry	7	26.0-28.0	SS	6-17-30-25	24
			8	28.0-30.0	SS	9-15-15-17	24
			9	30.0-32.0	SS	17-46-50/4"	18
		Moist @ 28.0'					
880.31	30.5	Gray sandy silt, trace of gravel (Till), moist					
879.81	31.0	Gray sandy silty clay with gravel (Till), dry					
878.81	32.0	Boring terminated @ 32.0'					

Dates Drilled: 5-31-87

Driller: Dave Newman

Water Depth: Initial:

Note: 300lb hammer used

Days after Completion:

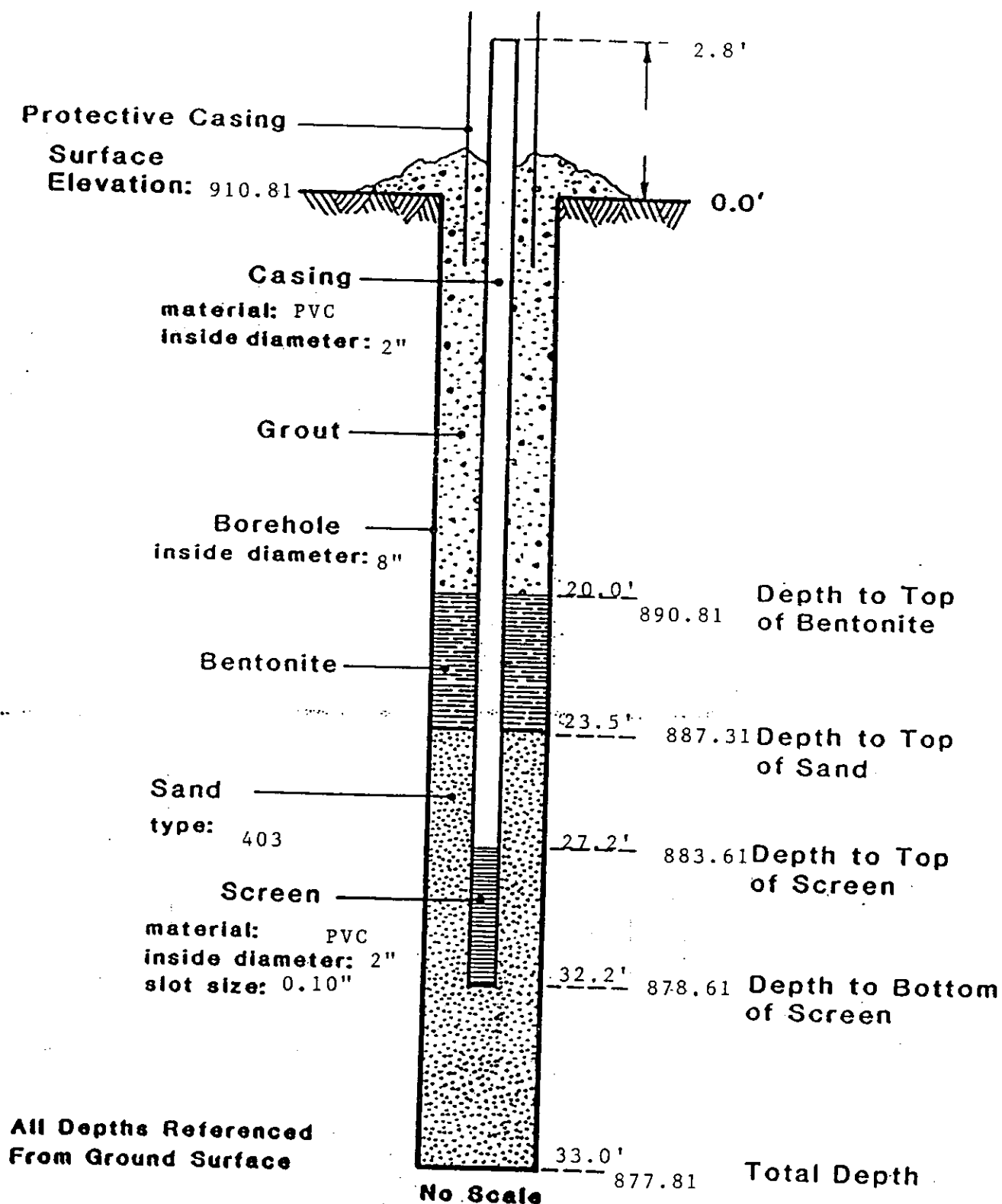
Days after Completion:

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

S&ME, INC.

Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. P-511A



CECOS International
 Hydrogeological Investigation of Cells
 16-27
 June 2, 1987
 1221-87-194

SOIL & MATERIAL ENGINEERS INC.
 CINCINNATI, OHIO

RECORD OF BORING NO.

P-513

Client: Cecos International

Page: 1 of 2

Project: Hydrogeological Investigation of Cells 16-27

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
910.61	0.0	Topsoil, mottled brown and gray clayey silt, organics, damp	1	0.0-2.0	SS	1-2-3-1	18
			2	2.0-4.0	SS	1-2-2-2	24
906.61	4.0	Mottled brown and gray sandy silty clay, trace of gravel, moist	3	4.0-6.0	SS	1-2-3-5	24
			4	6.0-8.0	SS	1-1-3-3	12
			5	8.0-10.0	SS	2-2-2-3	20
		0.5" silty fine sand @ 8.5'					
900.61	10.0	Brown sandy clayey silt with gravel (Till), dry	6	10.0-12.0	SS	3-7-14-16	24
			7	12.0-14.0	SS	10-20-23-34	20
			8	14.0-16.0	SS	5-15-17-27	20
			9	16.0-18.0	SS	7-11-17-19	20
			10	18.0-20.0	SS	8-12-13-14	24
			11	20.0-22.0	SS	5-79/1"	3
			12	22.0-24.0	SS	8-11-11-14	24
			13	24.0-26.0	SS	6-10-11-16	24
			14	26.0-28.0	SS	4-8-13-12	24
882.61	28.0	Gray silty fine-coarse sand with gravel, wet	15	28.0-30.0	SS	10-20-9-19	12
			16	30.0-32.0	SS	3-6-7-17	12
			17	32.0-34.0	SS	6-10-32-39	24
877.61	33.0	Gray sandy clayey silt with gravel (Till), dry	18	34.0-36.0	SS	20-57-70/1"	13
			19	36.0-38.0	SS	18-34-45-50	24
			20	38.0-40.0	SS	37-106/1"	7
			21	40.0-42.0	SS	64-79/1"	7
			22	42.0-44.0	SS	35-64/6"	12
			23	44.0-46.0	SS	31-50-50/3"	15
			24	46.0-48.0	SS	21-28-54-50/3"	21

Dates Drilled: 5/21-27/87

Driller: Dave Newman

Water Depth: Initial:

Note: 380lb. hammer used

Days after Completion:

Days after Completion:

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

RECORD OF BORING NO.

P-513

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 2 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
			25	48.0-50.0	SS	24-29-40-50/4"	18
			26	50.0-52.0	SS	27-39-50/2"	6
859.61	51.0	Interbedded gray shale and limestone (bedrock)	27	51.0-61.0	Core	N/A	120
849.61	61.0	Boring terminated @ 61.0'					

Dates Drilled:

Driller:

Water Depth: Initial:

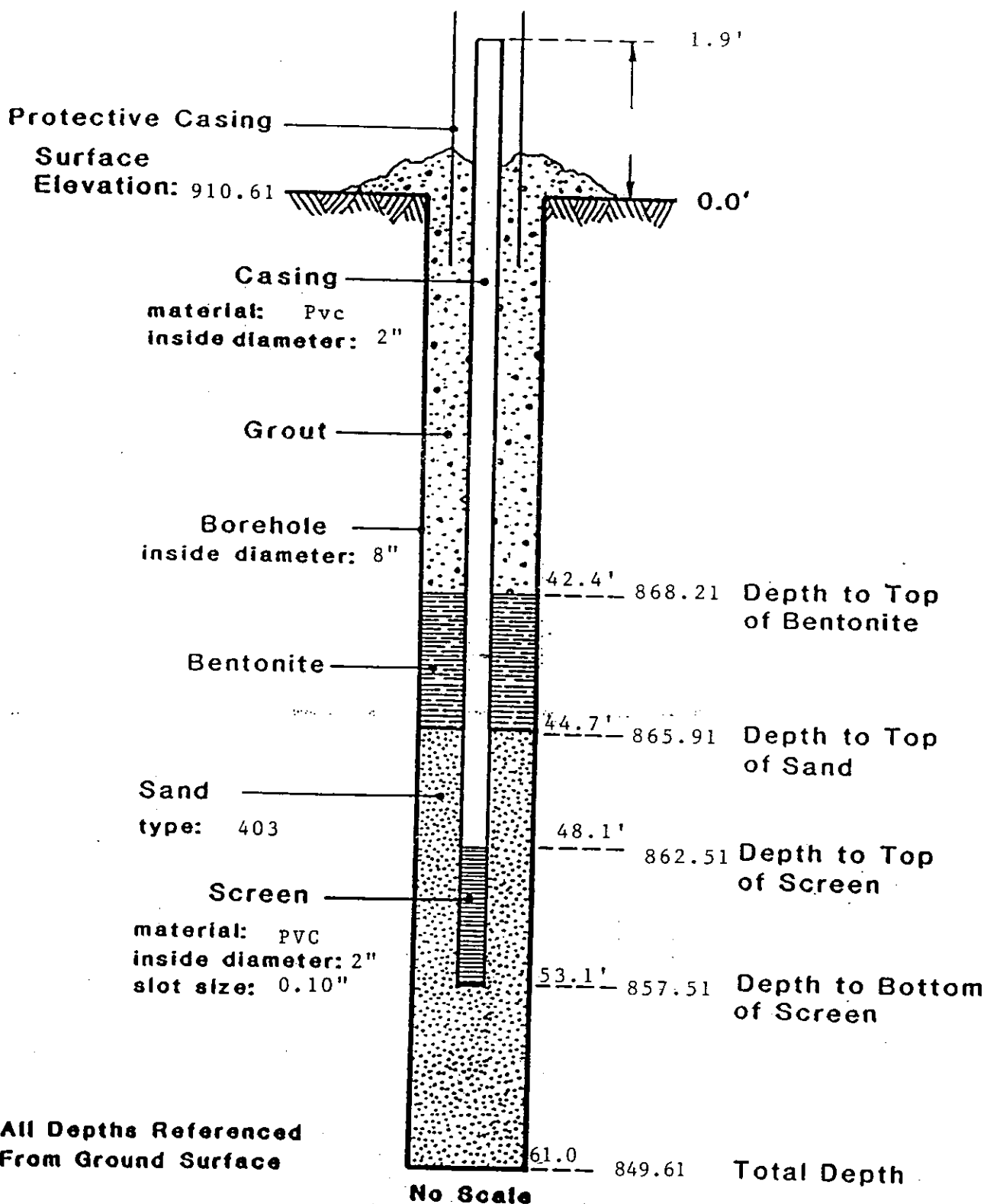
Days after Completion:

Days after Completion:

Drilling Method:

S&ME, INC.
Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. P-513



CECOS International
Hydrogeological Investigation of Cells
16-27
May 30, 1987
1221-87-194

SOIL & MATERIAL ENGINEERS INC.
CINCINNATI, OHIO

RECORD OF BORING NO.

P-515

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 1 of 4

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
911.01	0.0	Topsoil, brown clayey silt, organics, moist	1	0.0-2.0	SS	2-3-5-4	20
909.01	2.0	Brown sandy clayey silt, organics, moist	2	2.0-4.0	SS	6-7-8-8	22
			3	4.0-6.0	SS	7-7-8-9	24
905.01	6.0	Brown sandy clayey silt with gravel (Till), moist	4	6.0-8.0	SS	9-7-13-20	19
			5	8.0-10.0	SS	28-50/6"	12
			6	10.0-12.0	SS	3-12-30-38	21
899.41	11.6	Gray sandy silty clay with gravel (Till), dry	7	12.0-14.0	SS	12-28-30-35	24
			8*	14.0-16.0	SS	4-22-30-36	21
			9	16.0-18.0	SS	4-18-22-36	21
892.91	18.1	Gray silty fine-medium sand, wet	10	18.0-20.0	SS	14-20-32-37	24
890.81	20.2	Gray sandy silty clay with gravel (Till), dry	11	20.0-22.0	SS	14-28-40-40	24
			12	22.0-24.0	SS	17-39-55/6"	18
			13	24.0-26.0	SS	9-24-45-51/5"	23
885.91	25.1	Brown silty fine sand, wet					
885.11	25.9	Gray sandy silty clay with gravel (Till), moist	14	26.0-28.0	SS	23-44-44-53/4"	22
			15	28.0-30.0	SS	19-60-10-23	24

Dates Drilled: 5/27-30/87

Driller: Bernie Gollihue

Water Depth: Initial:

Note: 300lb hammer used

Days after Completion: *2 gallons of water added to hole.

Days after Completion:

S&ME, INC.

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

Cincinnati, Ohio

RECORD OF BORING NO.

P-515

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 2 of 4

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
881.71	29.3	Gray silty fine sand, wet	16	30.0-32.0	SS	11-25-38-58	24
880.11	31.9	Gray sandy clayey silt, moist	17	32.0-34.0	SS	10-20-28-70	24
879.81	34.2	Gray sandy clayey silt with gravel (Till), dry	18	34.0-36.0	SS	3-18-28-33	24
			19	36.0-38.0	SS	3-11-35-60	22
			20	38.0-40.0	SS	19-23-36-60	24
			21	40.0-42.0	SS	13-27-28-29	24
			22	42.0-44.0	SS	13-21-30-40	24
		2" gray silty medium-coarse sand @ 37.7'	23	44.0-46.0	SS	19-22-23-30	16
			24	46.0-48.0	SS	19-22-24-30	23
			25	48.0-50.0	SS	10-20-21-26	24
			26	50.0-52.0	SS	8-12-17-24	24
858.51	52.5	Gray medium sandy silt, moist	27	52.0-54.0	SS	10-20-71/6"	18
856.81	54.2	Gray sandy silty clay with gravel (Till), dry	28	54.0-56.0	SS	16-19-19-37	24
			29	56.0-58.0	SS	15-20-24-29	6
			30	58.0-60.0	SS	9-16-21-30	24
			31	60.0-62.0	SS	8-15-30-35	20
848.11	62.9	Green-gray sandy silty clay with gravel (Till), dry	32	62.0-64.0	SS	5-15-17-22	24
			33	64.0-66.0	SS	10-14-27-24	16
845.91	65.1	Gray silty fine-coarse sand, wet					

Dates Drilled: 5/27-30/87

Driller: Bernie Gollihue

Water Depth: Initial:

Note: 300lb hammer used

Days after Completion:

Days after Completion:

S&ME, INC.

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

Cincinnati, Ohio

RECORD OF BORING NO.

P-515

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 3 of 4

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
844.31	66.7	Gray sandy silty clay with gravel (Till), dry	34	66.0-68.0	SS	11-16-26-68	20
			35	68.0-70.0	SS	18-21-24-27	18
			36	70.0-72.0	SS	7-19-20-22	24
			37	72.0-74.0	SS	8-12-22-24	24
			38	74.0-76.0	SS	6-17-18-23	18
			39	76.0-78.0	SS	12-4-14-16	20
			40	78.0-80.0	SS	7-10-17-20	24
			41	80.0-82.0	SS	6-18-21-23	21
			42	82.0-84.0	SS	6-15-19-26	24
			43	84.0-86.0	SS	5-2-19-24	12
			44	86.0-88.0	SS	5-21-21-25	16
			45	88.0-90.0	SS	6-10-18-20	24
821.01	90.0	Olive green-grey sandy silty clay with gravel (Till), dry	46	90.0-92.0	SS	8-11-17-19	24
			47	92.0-94.0	SS	2-4-7-10	24
			48	94.0-96.0	SS	4-6-11-19	19
			49	96.0-98.0	SS	3-9-12-21	24
			50	98.0-100.0	SS	3-5-11-11	24
		Large limestone cobble @ 102.0'	51	100.0-102.0	SS	5-7-11-13	0
			52	102.0-104.0	SS	3-6-8-9-	2
			53	104.0-106.0	SS	2-7-10-15	10
804.51	106.5	Gray silty fine-medium sand, wet	54	106.0-108.0	SS	2-10-19-32	12
			55	108.0-110.0	SS	4-6-8-10	24
		110.0-113.0 rods fell under own weight	56	113.0-115.0	SS	2-3-5-4	24
795.61	115.4	Blue-gray sandy silty clay with gravel, moist	57	115.0-117.0	SS	2-5-5-7	24

Dates Drilled: 5/27-30/87

Driller: Bernie Collihue

Water Depth: Initial:

Note: 300lb hammer used

Days after Completion:

Days after Completion:

S&ME, INC.

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

Cincinnati, Ohio

RECORD OF BORING NO.

P-515

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 4 of 4

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
795.11	115.9						
		Grey silty fine sand, wet	58	117.0-119.0	SS	100/6"	6
794.51	116.5	Dark brown silty clay, organic, moist					
794.01	117.0	Blue-green sandy silt, organics, moist					
793.51	117.5	Blue-grey weathered shale, bedrock					
793.51	117.5	Boring terminated @ 117.5'					

Dates Drilled: 5/27-30/87

Driller: Bernie Gollihue

Water Depth: Initial:

Note: 300lb hammer used

Days after Completion:

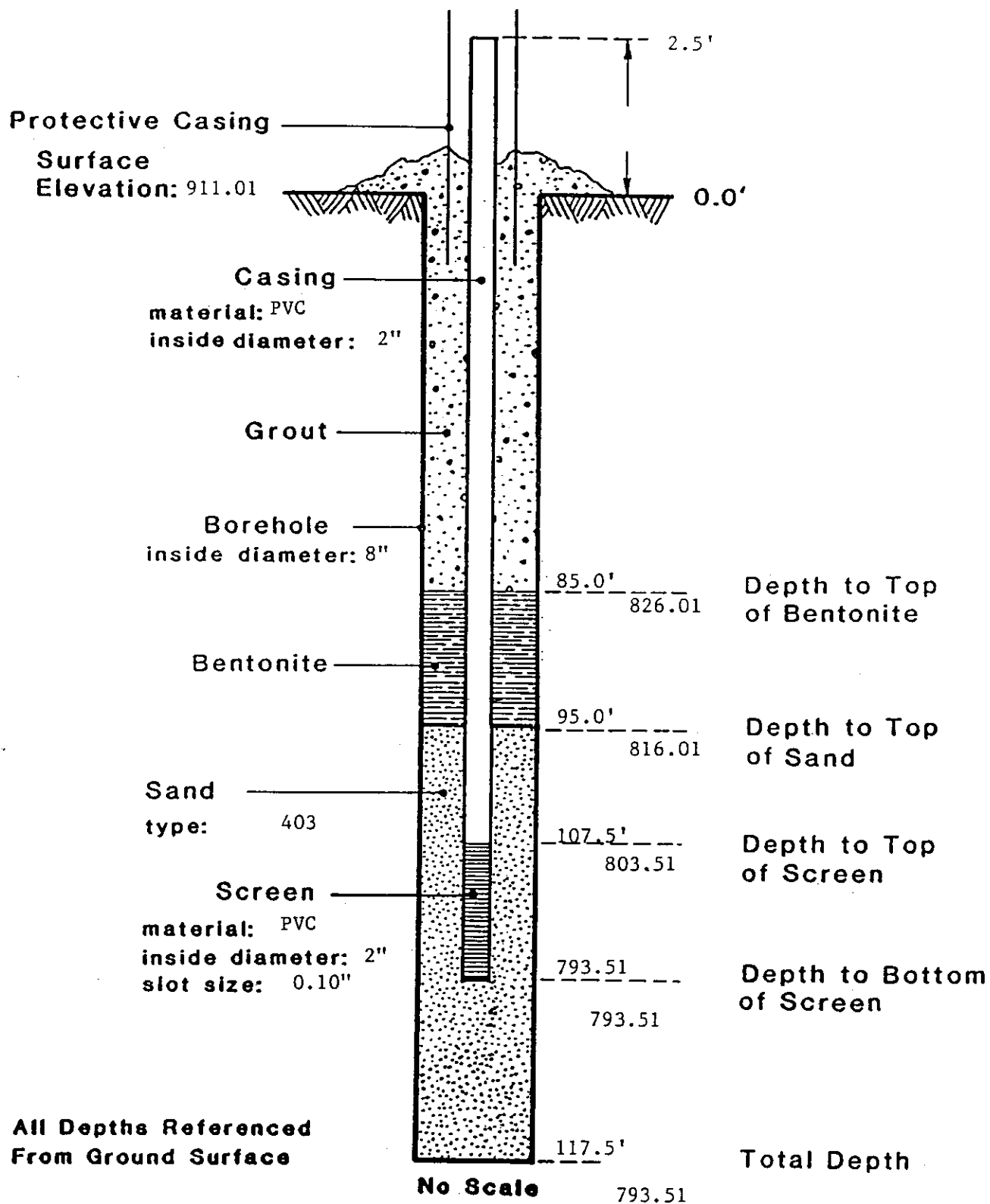
Days after Completion:

S&ME, INC.

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. P-515



CECOS International
 Hydrogeological Investigation of Cells
 16-27
 May 30, 1987

SOIL & MATERIAL ENGINEERS INC.
 CINCINNATI, OHIO

RECORD OF BORING NO.

P-515A

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 1 of 1

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
911.01	0.0	Augered with no sampling					
887.01	24.0	Gray sandy silty clay with gravel (Till), dry	1	24.0-26.0	SS	4-31-102/6"	14
885.71	25.3	Grey silty fine-medium sand, wet					
885.01	26.0	Gray sandy silty clay with gravel (Till), dry	2	26.0-28.0	SS	56-100/4"	10
			3	28.0-30.0	SS	9-21-30-68/5"	23
881.61	29.4	Grey silty fine-medium sand, trace of gravel, wet	4	30.0-32.0	SS	4-30-37-75	24
878.61	32.4	Gray clayey silt, moist	5	32.0-34.0	SS	14-45-75/6"	18
			6	34.0-36.0	SS	12-30-45-65	15
			7	36.0-38.0	SS	1-6-47-45	18
873.11	37.9	Gray sandy silty clay with gravel (Till), dry	8	38.0-40.0	SS	14-24-42-75	23
871.01	40.0	Boring terminated @ 40.0'					

Dates Drilled: 5/31/87

Driller: Bernie Gollihue

Water Depth: Initial:

Days after Completion:

Note: 300lb hammer used

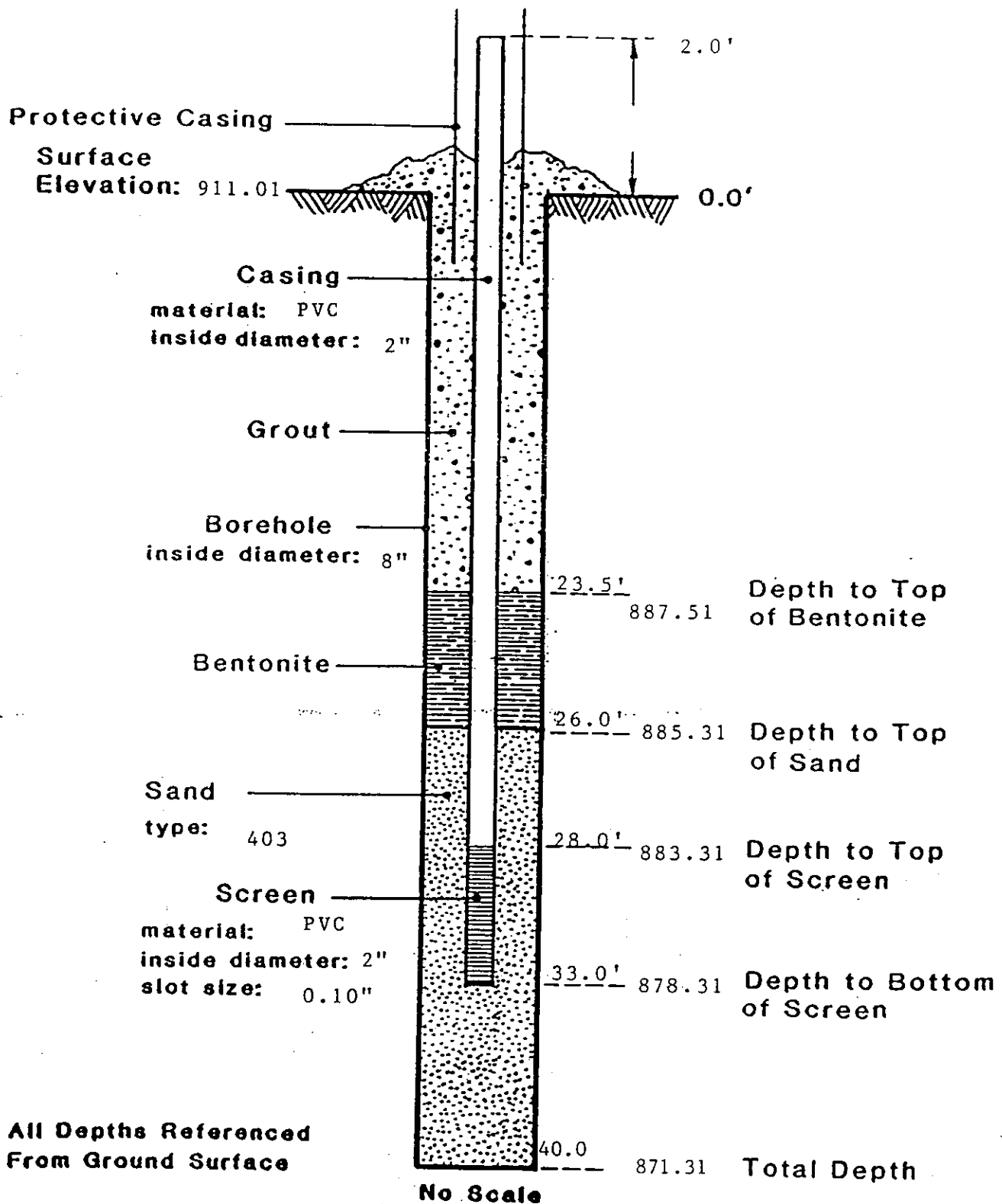
Days after Completion:

S&ME, INC.

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. p-515A



CECOS International
 Hydrogeological Investigation of Cells
 16-27
 May 31, 1987
 1221-87-194

SOIL & MATERIAL ENGINEERS INC.
 CINCINNATI, OHIO

RECORD OF BORING NO. P-517

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 1 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
909.3	0.0	Topsoil, brown sandy clay, organics, moist	1	0.0-2.0	SS	1-2-2-3	20
908.5	0.8	Mottled brown and gray sandy clay, organics, moist	2	2.0-4.0	SS	3-3-3-3	19
906.4	2.9	Light brown sandy silty clay, organics, moist					
904.5	4.8	Brown sandy silty clay with gravel (Till), damp	3 4	4.0-6.0 6.0-8.0	SS SS	3-4-10-15 23-60/6"	24 12
907.0	7.3	Gray sandy silty clay with gravel (Till), dry	5	8.0-10.0	SS	5-30-37-32	24
899.8	9.5	Gray sandy clayey silt, moist					
899.4	9.9	Gray silty very fine-medium sand, wet	6 7	10.0-12.0 12.0-14.0	SS SS	5-12-19-17 5-19-19-23	18 24
895.3	14.0	Gray silty fine-coarse sand and gravel, wet	8 9 10	14.0-16.0 16.0-18.0 18.0-20.0	SS SS SS	6-12-7-7 3-4-15-17 18-23-26-42	24 24 24

Dates Drilled: 6/3-4/87

Driller: Bernie Gollihue

Water Depth: Initial:

Note: 300 lb hammer used

Days after Completion:

Days after Completion:

Drilling Method: 4 1/2 " I.D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

RECORD OF BORING NO.

P-517

Client: Cecos International
Project: Hydrogeological Investigation of Cells 16-27
Project No.: 1221-87-194

Page: 2 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
889.5	19.8	Gray sandy silty clay with gravel (Till), moist	11	20.0-22.0	SS	6-14-23-39	14
			12	22.0-24.0	SS	10-18-55/2"	10
885.3	24.0	Gray silty fine-coarse sand and gravel, wet	13	24.0-26.0	SS	21-60/6"	12
884.8	24.5		14	26.0-28.0	SS	10-50/4"	10
880.8	28.5	Gray silty fine-coarse sand, wet	15	28.0-30.0	SS	5-10-50/6"	18
			16	30.0-32.0	SS	10-17-45-65	24
			17	32.0-34.0	SS	10-22-52/6"	18
			18	34.0-36.0	SS	25-32-52/6"	18
			19	36.0-38.0	SS	5-10-17-23	16
			20	38.0-40.0	SS	10-14-30-47	24
			27	40.0-42.0	SS	2-13-24-24	20
867.6	41.7	Gray sandy silty clay with gravel (Till), dry	28	42.0-44.0	SS	5-10-18-20	14
			29	44.0-46.0	SS	5-14-14-17	9
863.3	46.0	Boring terminated @ 46.0'					

Dates Drilled: 6/3-4/87

Driller: Bernie Collihue

Water Depth: Initial:

Note: 300 lb hammer used

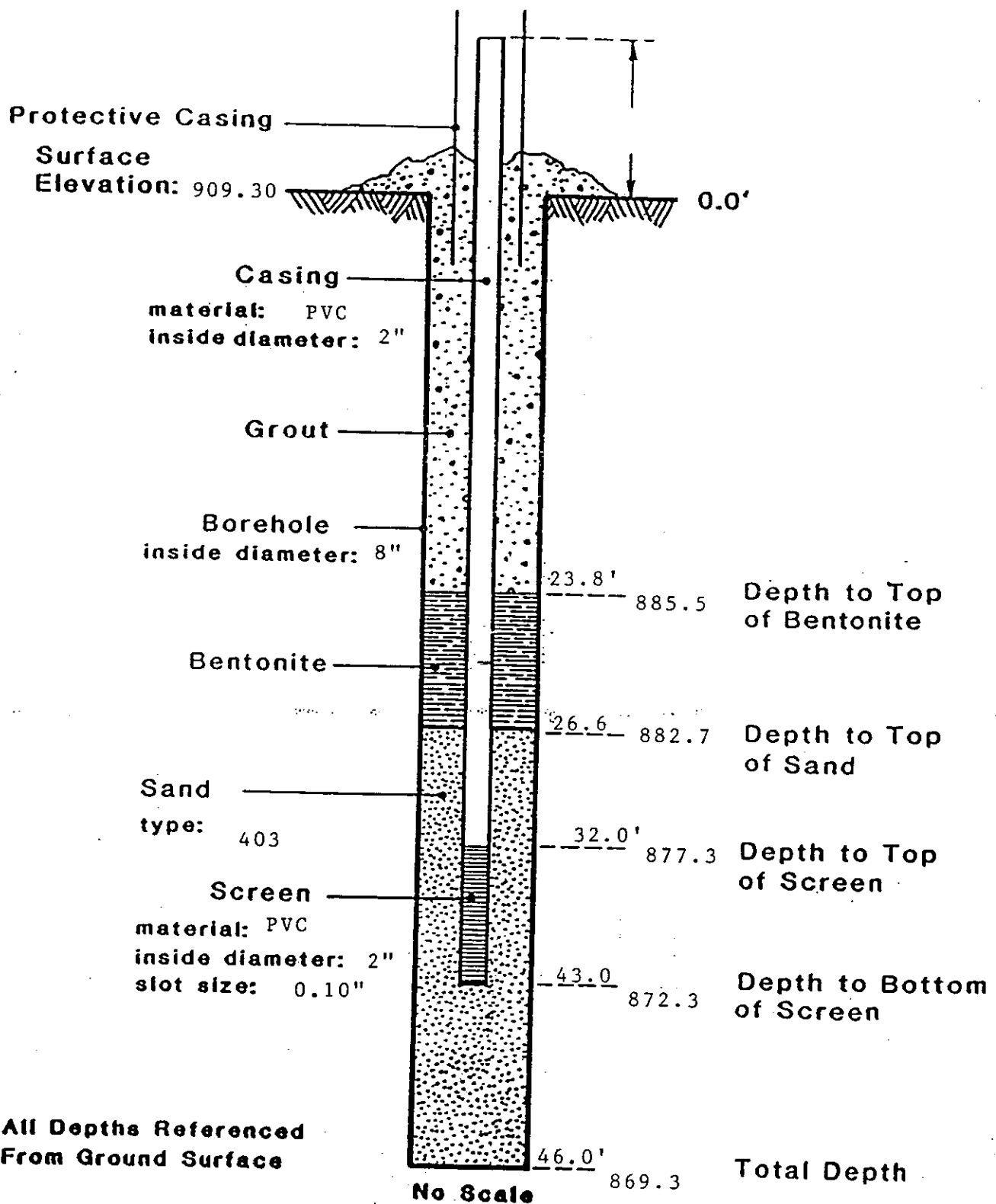
Days after Completion:

Days after Completion:

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. P-517



CECOS International
 Hydrogeological Investigation of Cells
 16-27
 June 4, 1987
 1221-87-194

SOIL & MATERIAL ENGINEERS INC.
 CINCINNATI, OHIO

RECORD OF BORING NO.

P-520

Client: Cecos International

Page: 1 of 3

Project: Hydrogeological Investigation of Cells 16-27

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
911.95	0.0	Topsoil, tan-brown silty clay organics, moist	1	0.0-2.0	SS	1-2-3-2	20
			2	2.0-4.0	SS	2-3-3-3	18
907.95	4.0	Mottled brown & grey sandy clayey silt, trace gravel, moist	3	4.0-6.0	SS	2-4-4-4	15
			4	6.0-8.0	SS	1-3-3-3	21
			5	8.0-10.0	SS	5-7-12-27	24
902.95	9.0	Brown sandy clayey silt with gravel (Till), dry	6	10.0-12.0	SS	10-22-28-36	24
			7	12.0-14.0	SS	14-23-34-24	20
897.65	14.3	Grey silty fine-coarse sand and gravel, wet	8	14.0-16.0	SS	12-20-21-22	24
			9	16.0-18.0	SS	2-7-13-15	19
896.95	15.0	Grey silty fine sand, wet					
893.45	18.5	Grey silty fine-coarse sand and gravel, wet	10	18.0-20.0	SS	11-12-16-22	22
892.35	19.6	Grey fine sandy silt, wet					
891.95	20.0	Grey sandy silty clay with gravel (Till), dry	11	20.0-22.0	SS	13-21-25-30	20

Dates Drilled: 6-4-87

Driller: Dave Newman

Water Depth: Initial:

Note: 300lb hammer used

Days after Completion:

Days after Completion:

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

RECORD OF BORING NO. P-520

Client: Cecos International

Page: 2 of 3

Project: Hydrogeological Investigation of Cells 16-27

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
			12	22.0-24.0	SS	14-20-50-27	24
			13	24.0-26.0	SS	11-22-31-50/5"	22
			14	26.0-28.0	SS	5-50-50/3"	9
883.65	28.3	Brown silty fine sand with gravel, wet	15	28.0-30.0	SS	26-42-50/3"	15
881.95	30.0	Grey sandy clayey silt with gravel (Till), moist	16	30.0-32.0	SS	17-26-45-50/4"	22
881.55	30.4	Grey silty fine-coarse sand with gravel, wet					
880.95	31.0	Grey sandy clayey silt with gravel (Till), dry					
879.65	32.3	Grey silty fine-coarse sand, trace gravel, wet	17	32.0-34.0	SS	13-16-19-29	24
877.95	34.0	Grey silty very fine sand, wet	18	34.0-36.0	SS	5-13-20-22	24
			19	36.0-38.0	SS	2-17-50/4"	16

Dates Drilled: 6-4-87

Driller: Dave Newman

Water Depth: Initial:

Note: 300lb hammer used

Days after Completion:

Days after Completion:

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

S&ME, INC.

Cincinnati, Ohio

RECORD OF BORING NO.

P-520

Client: Cecos International

Page: 3 of 3

Project: Hydrogeological Investigation of Cells 16-27

Project No.: 1221-87-194

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
			20	38.0-40.0	SS	5-12-18-22	24
872.75	39.2						
		Grey sandy clayey silt	21	40.0-42.0	SS	11-22-27-27	24
		with gravel (Till), dry	22	42.0-44.0	SS	11-25-29-34	24
867.95	44.0						
		Boring terminated @ 44.0'					

Dates Drilled: 6-4-87

Driller: Dave Newman

Water Depth: Initial:

Note: 300lb hammer used

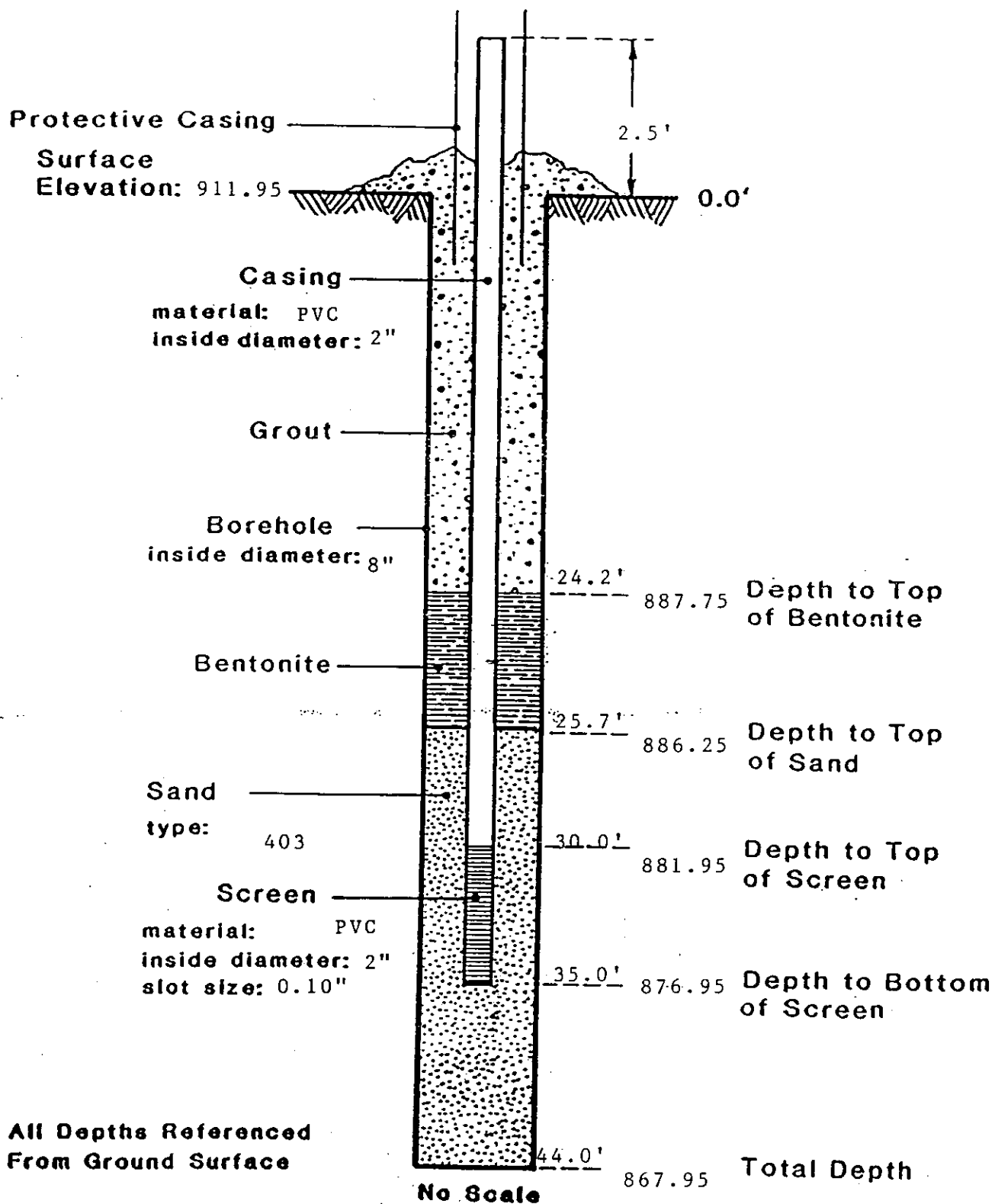
Days after Completion:

Days after Completion:

Drilling Method: 4 1/2" I.D. Hollow Stem Augers

S&ME, INC.
Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. P-520



CECOS International
Hydrogeological Investigation of Cells
16-27
June 5, 1987
1221-87-194

SOIL & MATERIAL ENGINEERS INC.
CINCINNATI, OHIO

PRELIMINARY

RECORD OF BORING NO.

P/ 527

Client: CECOS International
Project: PC Ponds
Project No.: 1221-87-340-2.0

Page: 1 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
892.99	0.0	Brown sandy lean clay, moist - stiff to very stiff	1	0.0-2.0	SS	4-5-9-9	9"
890.99	2.0	Brown silty clay, moist - stiff	2	2.0-4.0	SS	8-7-8-5	16"
887.59	5.4	Brown and gray silty clay, moist - medium stiff	3	4.0-6.0	SS	3-3-3-9	18"
887.29	5.7	Brown sandy lean clay, clay, moist - very hard	4	6.0-8.0	SS	21-33-51-53	18"
884.19	8.8	Brown and gray sandy lean clay with gravel, moist - very hard	5	8.0-10.0	SS	10-21-26-26	18"
883.49	9.5	Gray uniformly-graded fine sand, wet - very dense	6	10.0-12.0	SS	15-22-40-56	12"
881.49	11.5	Gray sandy lean clay with gravel, wet - very hard					

Dates Drilled: 10-20-87

Driller: J. Jones

Water Depth: Initial:

Days after Completion:

Days after Completion:

Drilling Method: 3-1/4 I.D. Hollow Stem Auger

S&ME, INC.
Cincinnati, Ohio

PRELIMINARY

RECORD OF BORING NO.

P- 527

Client: CECOS International
Project: PC Ponds
Project No.: 1221-87-340-2.0

Page: 2 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
880.49	12.5	Gray well-graded sand, wet - dense	7	12.0-14.0	SS	5-17-26-29	12"
878.99	14.0	Gray sandy lean clay with silt lenses, moist - hard	8	14.0-16.0	SS	8-19-24-27	12"
876.99	16.0	Gray sandy lean clay with gravel, moist - very hard	9 10 11 12	16.0-18.0 18.0-20.0 20.0-22.0 22.0-24.0	SS SS SS SS	11-28-40-55 15-36-40-58 16-23-28-42 12-28-38-56	18" 18" 18" 18"
868.99	24.0	Boring terminated @ 24.0 ft.					

Dates Drilled: 10-21-87

Driller: J. Jones

Water Depth: Initial:

Days after Completion:

Days after Completion:

Drilling Method: 3-1/4 I.D. Hollow Stem Auger

S&ME, INC.
Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. P- 527

WELL LOCATION: _____ SURFACE ELEVATION: 892.99

DATE INSTALLED: 10-20-87 TOP OF CASING ELEVATION: 894.99

TYPE OF WELL: _____

DATE	DEPTH TO WATER (ft) *	ELEVATION OF WATER (MSL)	INSTALLATION DESCRIPTION
PRELIMINARY			<div style="text-align: right;"> DEPTH (ft) ELEV. (ft) </div> <div style="text-align: right;"> <u>-2.0</u> </div> <div style="text-align: right;"> <u>0.0</u> <u>892.99</u> </div> <div style="text-align: right;"> <u>6.0</u> <u>886.99</u> </div> <div style="text-align: right;"> <u>8.0</u> <u>884.99</u> </div> <div style="text-align: right;"> <u>10.0</u> <u>882.99</u> </div> <div style="text-align: right;"> <u>15.0</u> <u>877.99</u> </div> <div style="text-align: right;"> <u>24.0</u> <u>868.99</u> </div>
			Cement
			6.0
			Bentonite
			8.0
			Sand

OWNER: _____



S&ME CINCINNATI, OHIO

PROJECT NO: 1221-87-340-2.0

* REFERENCE: _____

FIGURE _____

PRELIMINARY

RECORD OF BORING NO.

528

Client: CECOS International
Project: PC Ponds
Project No.: 1221-87-340-2.0

Page: 1 of 1

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
895.7	0.0	Brown sandy lean clay with gravel, moist - very hard	1	2.0-4.0	SS	11-21-27-36	18"
			2	4.0-6.0	SS	16-36-59-45	18"
889.2	6.5	Gray sandy lean clay with gravel, moist - very hard	3	6.0-8.0	SS	14-24-29-34	18"
			4	8.0-10.0	SS	8-17-17-21	18"
			5	10.0-12.0	SS	9-12-16-18	18"
			6	12.0-14.0	SS	9-10-18-21	18"
880.5	15.2	Gray uniformly-graded fine sand, wet - dense	7	14.0-16.0	SS	8-13-29-70	18"
879.7	16.0	Gray well-graded sand with gravel, wet - very dense	8	16.0-18.0	SS	42-60-80-95	18"
878.7	17.0	Gray sandy lean clay, moist - very hard					
877.7	18.0	Gray sandy silt with gravel, wet - hard	9	18.0-20.0	SS	7-40-69-100	18"
877.2	18.5	Gray sandy lean clay, moist - very hard	10	20.0-22.0	SS	31-53-84-91	18"
			11	22.0-24.0	SS	35-69-102-165	18"
871.7	24.0	Boring terminated @ 24.0 ft.					

Dates Drilled: 10-21-87

Driller: J. Jones

Water Depth: Initial:

Days after Completion:

Days after Completion:

Drilling Method: 3-1/4 I.D. Hollow Stem Auger

S&ME, INC.

Cincinnati, Ohio

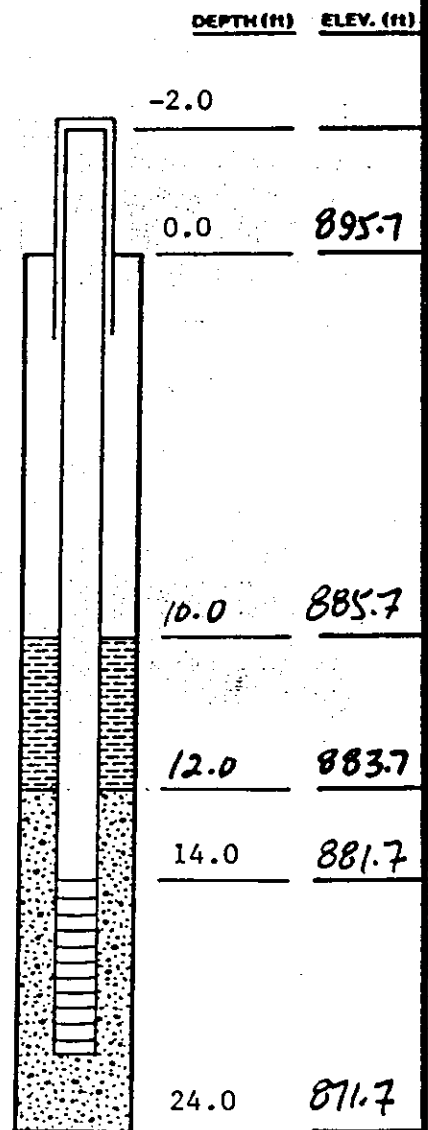
CONSTRUCTION LOG OF WELL NO. P-528

WELL LOCATION: _____ SURFACE ELEVATION: 895.7

DATE INSTALLED: 10-21-87 TOP OF CASING ELEVATION: _____

TYPE OF WELL: _____

DATE	DEPTH TO WATER (ft) *	ELEVATION OF WATER (MSL)	INSTALLATION DESCRIPTION
PRELIMINARY			
			Cement
			Bentonite
			Sand



OWNER: _____

* REFERENCE: _____



S&ME

CINCINNATI, OHIO

PROJECT NO: 1221-87-340-2.0

FIGURE _____

PRELIMINARY

RECORD OF BORING NO.

p. 529

Client: CECOS International
Project: PC Ponds
Project No.: 1221-87-340-2.0

Page: 1 of 2

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
897.7	0.0	Brown sandy lean clay, with gravel, moist - hard					
892.2	5.5	Brown silty fine sand, moist - very dense	1	5.0-7.0	SS	15-17-25-28	18"
891.0	6.7	Brown sandy lean clay with gravel, moist - very hard	2	7.0-9.0	SS	13-75-95-105	18"
888.7	9.0	Brown and gray sandy lean clay with gravel, moist - very hard	3 4 5	9.0-11.0 11.0-13.0 13.0-15.0	SS SS SS	16-33-36-43 13-24-30-32 9-14-22-23	18" 18" 18"
876.7	21.0	Gray sandy lean clay, moist - very hard	6 7	15.0-17.0 17.0-19.0	SS SS	14-23-29-36 11-23-22-32	12" 18"
876.2	21.5	Gray clayey fine sand, wet - dense	8 9	19.0-21.0 21.0-23.0	SS SS	17-20-20-30 7-9-8-17	18" 18"

Dates Drilled: 10-22-87

Driller: J. Jones

Water Depth: Initial:

Days after Completion:

Days after Completion:

Drilling Method: 3-1/4 I.D. Hollow Stem Auger

S&ME, INC.

Cincinnati, Ohio

PRELIMINARY

RECORD OF BORING NO.

529

Client: CECOS International

Page: 2 of 2

Project: PC Ponds

Project No.: 1221-87-340-2.0

Elev. (ft.)	Depth (ft.)	Description	Sample No.	Sample Depth (ft.)	Sample Type	Blows per 6"	Recovery (in.)
874.7	23.0	Gray uniformly graded medium coarse sand, wet - very dense	10	23.0-25.0	SS	10-24-43-55	18"
874.2	23.5	Gray sandy lean clay, moist - very hard	11	25.0-27.0	SS	20-38-70-84	18"
873.1	24.0	Boring terminated @ 24.0 ft.					

Dates Drilled: 10-22-87

Driller: J. Jones

Water Depth: Initial:

Days after Completion:

Days after Completion:

Drilling Method: 3-1/4 I.D. Hollow Stem Auger

S&ME, INC.

Cincinnati, Ohio

CONSTRUCTION LOG OF WELL NO. 9 529

WELL LOCATION: _____

SURFACE ELEVATION: 897.7

DATE INSTALLED: 10-22-87

TOP OF CASING ELEVATION: _____

TYPE OF WELL: _____

DATE	DEPTH TO WATER (ft) *	ELEVATION OF WATER (MSL)	INSTALLATION DESCRIPTION
PRELIMINARY			
			<div style="display: flex; align-items: center;"> <div style="flex: 1;"> <p style="text-align: center;">Cement</p> <p style="text-align: center;">Bentonite</p> <p style="text-align: center;">Sand</p> </div> <div style="flex: 1; text-align: center;"> </div> <div style="flex: 1;"> <p style="text-align: right;">-2.0</p> <hr/> <p style="text-align: right;">0.0 897.7</p> <hr/> <p style="text-align: right;">11.0 886.7</p> <hr/> <p style="text-align: right;">13.0 884.7</p> <hr/> <p style="text-align: right;">15.0 882.7</p> <hr/> <p style="text-align: right;">25.0 872.7</p> <hr/> <p style="text-align: right;">27.0 870.7</p> <hr/> </div> </div>

OWNER:



S&ME

CINCINNATI, OHIO

1221-87-340-2.0

PROJECT NO:

* REFERENCE:

FIGURE _____

LOCATION MAP		PARSONS ENGINEERING SCIENCE LOG				PAGE 1 OF 2	
ELEVATION 905.5		WELL NUMBER USPZ-1		LOCATION CECOS			
		DATE 10/21/97		WEATHER 51°. CLOUDY			
		LOCATED BY BILL REID		DRILLED BY BOART LONGYEAR			
		DRILLING METHOD 3.25" HSA		SAMPLING METHOD 2" SPLIT SPOON			
		GRAVEL PACK #5 SILICA SAND		SEAL BENTONITE			
CASING TYPE SCH 40 PVC		DIAMETER 1"		LENGTH 17'		HOLE DIA. 6"	
SCREEN TYPE SCH 40 PVC		SLOT 0.010"		DIAMETER 1"		LENGTH 5'	
						TOTAL DEPTH 22'	
SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH (FT)	SAMPLE RECOVERY	PENETRATION RESISTANCE	DESCRIPTION/REMARKS (COLOR, MOISTURE, PLASTICITY, SORTING, SOIL TYPE)	LITHO. PROFILE	WELL COMPLETION STICK - UP
		0		140 lb	HAMMER		
		1		5	MOIST BROWN SILTY CLAY WITH SOME GRAVEL		
				7			
				8			
				11			
		2		12	NO RECOVERY		
				12			
				20			
				32			
		4		8	MOIST, PLASTIC BROWN & GRAY MOTTLED SILTY CLAY WITH SOME GRAVEL		
				5			
				10			
				15			
		6		6	DRY, HARD BROWN SILTY CLAY WITH SOME GRAVEL		
				7			
				11			
				13			
		8		2	DRY, FRIABLE, BROWN SILTY CLAY WITH SOME GRAVEL		
				13			
				30			
				40			
		10		5	DRY, FRIABLE, BROWN SILTY CLAY WITH SOME GRAVEL		
				33			
				50			
				60			
		12		15	DRY, FRIABLE, BROWN SILTY CLAY WITH SOME GRAVEL		
				35			
				60			
				70			
		14		5	DRY, FRIABLE, BROWN SILTY CLAY WITH SOME GRAVEL		
				26			
				40			
				50			
		16		70	DRY, FRIABLE, BROWN SILTY CLAY WITH SOME GRAVEL		
				85			
				100			
				100			
		18		15	VERY MOIST, FRIABLE, GRAY SILT WITH SOME GRAVEL		
				30			
				37			
				42			
		20			DRY, HARD GRAY SILTY CLAY WITH SOME GRAVEL		
		21					

FEBRUARY-18-98 BTMH 726891USPZ-11.DWG

SAND

BACKFILL

CASING

SCREEN

BENTONITE

CEMENT

INITIAL WATER LEVEL

STATIC WATER LEVEL

CECOS 087241

LOCATION MAP			PARSONS ENGINEERING SCIENCE LOG				PAGE 2 OF 2	
ELEVATION 905.5			WELL NUMBER USPZ-1		LOCATION CECOS			
			DATE 10/21/97		WEATHER 51°. CLOUDY			
			LOCATED BY BILL REID		DRILLED BY BOART LONGYEAR			
			DRILLING METHOD 3.25" HSA		SAMPLING METHOD 2" SPLIT SPOON			
			GRAVEL PACK #5 SILICA SAND		SEAL BENTONITE			
CASING TYPE SCH 40 PVC			DIAMETER 1"		LENGTH 17'		HOLE DIA. 6"	
SCREEN TYPE SCH 40 PVC			SLOT 0.010"		DIAMETER 1"		LENGTH 5'	
							TOTAL DEPTH 22'	
SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH (FT)	SAMPLE RECOVERY	PENETRATION RESISTANCE	DESCRIPTION/REMARKS (COLOR, MOISTURE, PLASTICITY, SORTING, SOIL TYPE.)	LITHO. PROFILE	WELL COMPLETION	
		20		6	WET GRAY SILT WITH SOME SAND & GRAVEL			
		21		15	MOIST GRAY SILT WITH SOME GRAVEL			
				31				
		22		30	DRY, FRIABLE SILTY CLAY WITH SOME GRAVEL			
		23						
		24						
		25						
		26						
		27						
		28						
		29						
		30						
		31						
		32						
		33						
		34						
		35						
		36						
		37						
		38						
		39						
		40						
		41						

FEBRUARY-18-98 BTMH 726691USPZ-12.DWG

SAND	CASING	BENTONITE	INITIAL WATER LEVEL
BACKFILL	SCREEN	CEMENT	STATIC WATER LEVEL

CECOS
087242

APPENDIX F
ELECTRONIC DATA FILES ON CD

APPENDIX G
NORMALITY RESULTS AND
INTRA-WELL PREDICTION LIMITS,
CHANNEL SAND ZONE

RESULTS OF INTRAWELL STATISTICAL ANALYSES
CHANNEL SAND WELL MP-281C
ABER ROAD FACILITY

Parameter	Number of Background Observations	Background Percent Nondetect	Background Period	Shapiro-Wilks Test		Distribution Used	Statistical Method*	Prediction Limit (mg/L)
				W Statistic	Critical Value			
Arsenic, Dissolved	12	0	10/10 - 7/14	0.9585	0.805	Original	PPL	0.0052
Barium, Dissolved	8	0	10/12 - 7/14	0.8574	0.749	Original	PPL	0.057
Cadmium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.001
Chromium, Dissolved	39	100	10/97 - 7/14	--	--	--	NPPL	<0.005
Lead, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.005
Mercury, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.0002
Selenium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.015
Silver, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.003

* NPPL = Nonparametric Prediction Limit; PPL = Parametric Prediction Limit;

Note: Outliers were removed prior to conducting statistical analyses.

RESULTS OF INTRAWELL STATISTICAL ANALYSES
CHANNEL SAND WELL MP-406C
ABER ROAD FACILITY

Parameter	Number of Background Observations	Background Percent Nondetect	Background Period	Shapiro-Wilks Test		Distribution Used	Statistical Method*	Prediction Limit (mg/L)
				W Statistic	Critical Value			
Arsenic, Dissolved	8	0	10/12 - 7/14	0.8492	0.749	Original	PPL	0.0043
Barium, Dissolved	8	0	10/12 - 7/14	--	--	--	NPPL	0.15
Cadmium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.001
Chromium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.005
Lead, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.005
Mercury, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.0002
Selenium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.015
Silver, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.003

* NPPL = Nonparametric Prediction Limit; PPL = Parametric Prediction Limit;

Note: Outliers were removed prior to conducting statistical analyses.

**APPENDIX H
NORMALITY RESULTS AND
INTRA-WELL PREDICTION LIMITS,
BTI ZONE**

**RESULTS OF INTRAWELL STATISTICAL ANALYSES
BEDROCK-TILL INTERFACE (BTI) WELL MP-233R
ABER ROAD FACILITY**

Parameter	Number of Background Observations	Background Percent Nondetect	Background Period	Shapiro-Wilks Test		Distribution Used	Statistical Method*	Prediction Limit (mg/L)
				W Statistic	Critical Value			
Arsenic, Dissolved	14	0	10/97 - 7/14	0.9054	0.825	Original	PPL	0.013
Barium, Dissolved	8	0	10/12 - 7/14	0.9344	0.749	Original	PPL	0.55
Cadmium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.001
Chromium, Dissolved	37	95	10/97 - 7/14	--	--	--	NPPL	0.0096
Lead, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.005
Mercury, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.0002
Selenium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.015
Silver, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.003

* NPPL = Nonparametric Prediction Limit; PPL = Parametric Prediction Limit;

Note: Outliers were removed prior to conducting statistical analyses.

**RESULTS OF INTRAWELL STATISTICAL ANALYSES
BEDROCK-TILL INTERFACE (BTI) WELL MP-234R
ABER ROAD FACILITY**

Parameter	Number of Background Observations	Background Percent Nondetect	Background Period	Shapiro-Wilks Test		Distribution Used	Statistical Method*	Prediction Limit (mg/L)
				W Statistic	Critical Value			
Arsenic, Dissolved	16	0	10/97 - 7/14	0.9037	0.844	Original	PPL	0.015
Barium, Dissolved	8	0	10/12 - 7/14	0.8874	0.749	Original	PPL	0.051
Cadmium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.001
Chromium, Dissolved	36	97	10/97 - 7/14	--	--	--	NPPL	0.0057
Lead, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.005
Mercury, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.0002
Selenium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.015
Silver, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.003

* NPPL = Nonparametric Prediction Limit; PPL = Parametric Prediction Limit;

Note: Outliers were removed prior to conducting statistical analyses.

**RESULTS OF INTRAWELL STATISTICAL ANALYSES
BEDROCK-TILL INTERFACE (BTI) WELL MP-235R
ABER ROAD FACILITY**

Parameter	Number of Background Observations	Background Percent Nondetect	Background Period	Shapiro-Wilks Test		Distribution Used	Statistical Method*	Prediction Limit (mg/L)
				W Statistic	Critical Value			
Arsenic, Dissolved	12	0	10/97 - 7/14	0.9171	0.805	Original	PPL	0.0057
Barium, Dissolved	8	0	10/12 - 7/14	0.9423	0.749	Original	PPL	0.052
Cadmium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.001
Chromium, Dissolved	38	95	10/97 - 7/14	--	--	--	NPPL	0.0075
Lead, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.005
Mercury, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.0002
Selenium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.015
Silver, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.003

* NPPL = Nonparametric Prediction Limit; PPL = Parametric Prediction Limit;

Note: Outliers were removed prior to conducting statistical analyses.

**RESULTS OF INTRAWELL STATISTICAL ANALYSES
BEDROCK-TILL INTERFACE (BTI) WELL MP-237
ABER ROAD FACILITY**

Parameter	Number of Background Observations	Background Percent Nondetect	Background Period	Shapiro-Wilks Test		Distribution Used	Statistical Method*	Prediction Limit (mg/L)
				W Statistic	Critical Value			
Arsenic, Dissolved	8	13	10/12 - 7/14	0.8078	0.749	Original	PPL	0.0023
Barium, Dissolved	8	0	10/12 - 7/14	0.846	0.749	Original	PPL	0.033
Cadmium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.001
Chromium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.005
Lead, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.005
Mercury, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.0002
Selenium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.015
Silver, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.003

* NPPL = Nonparametric Prediction Limit; PPL = Parametric Prediction Limit;

Note: Outliers were removed prior to conducting statistical analyses.

**RESULTS OF INTRAWELL STATISTICAL ANALYSES
BEDROCK-TILL INTERFACE (BTI) WELL MP-238R
ABER ROAD FACILITY**

Parameter	Number of Background Observations	Background Percent Nondetect	Background Period	Shapiro-Wilks Test		Distribution Used	Statistical Method*	Prediction Limit (mg/L)
				W Statistic	Critical Value			
Arsenic, Dissolved	12	100	10/10 - 7/14	--	--	--	NPPL	<0.001
Barium, Dissolved	8	0	10/12 - 7/14	0.9716	0.749	Original	PPL	0.053
Cadmium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.001
Chromium, Dissolved	37	100	10/97 - 7/14	--	--	--	NPPL	<0.005
Lead, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.005
Mercury, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.0002
Selenium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.015
Silver, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.003

* NPPL = Nonparametric Prediction Limit; PPL = Parametric Prediction Limit;

Note: Outliers were removed prior to conducting statistical analyses.

**RESULTS OF INTRAWELL STATISTICAL ANALYSES
BEDROCK-TILL INTERFACE (BTI) WELL MP-241R
ABER ROAD FACILITY**

Parameter	Number of Background Observations	Background Percent Nondetect	Background Period	Shapiro-Wilks Test		Distribution Used	Statistical Method*	Prediction Limit (mg/L)
				W Statistic	Critical Value			
Arsenic, Dissolved	12	0	10/10 - 7/14	0.9507	0.805	Original	PPL	0.0034
Barium, Dissolved	8	0	10/12 - 7/14	0.8327	0.749	Original	PPL	0.057
Cadmium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.001
Chromium, Dissolved	37	100	10/97 - 7/14	--	--	--	NPPL	<0.005
Lead, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.005
Mercury, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.0002
Selenium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.015
Silver, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.003

* NPPL = Nonparametric Prediction Limit; PPL = Parametric Prediction Limit;

Note: Outliers were removed prior to conducting statistical analyses.

**RESULTS OF INTRAWELL STATISTICAL ANALYSES
BEDROCK-TILL INTERFACE (BTI) WELL MP-244R
ABER ROAD FACILITY**

Parameter	Number of Background Observations	Background Percent Nondetect	Background Period	Shapiro-Wilks Test		Distribution Used	Statistical Method*	Prediction Limit (mg/L)
				W Statistic	Critical Value			
Arsenic, Dissolved	12	8	10/10 - 7/14	0.9229	0.805	Original	PPL	0.0076
Barium, Dissolved	8	0	10/12 - 7/14	0.8748	0.749	Original	PPL	0.027
Cadmium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.001
Chromium, Dissolved	37	97	10/97 - 7/14	--	--	--	NPPL	0.0071
Lead, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.005
Mercury, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.0002
Selenium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.015
Silver, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.003

* NPPL = Nonparametric Prediction Limit; PPL = Parametric Prediction Limit;

Note: Outliers were removed prior to conducting statistical analyses.

**RESULTS OF INTRAWELL STATISTICAL ANALYSES
BEDROCK-TILL INTERFACE (BTI) WELL MP-250
ABER ROAD FACILITY**

Parameter	Number of Background Observations	Background Percent Nondetect	Background Period	Shapiro-Wilks Test		Distribution Used	Statistical Method*	Prediction Limit (mg/L)
				W Statistic	Critical Value			
Arsenic, Dissolved	12	17	10/10 - 7/14	0.9254	0.805	Original	PPL	0.0047
Barium, Dissolved	8	0	10/12 - 7/14	0.8469	0.749	Original	PPL	0.063
Cadmium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.001
Chromium, Dissolved	36	100	10/97 - 7/14	--	--	--	NPPL	<0.005
Lead, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.005
Mercury, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.0002
Selenium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.015
Silver, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.003

* NPPL = Nonparametric Prediction Limit; PPL = Parametric Prediction Limit;

Note: Outliers were removed prior to conducting statistical analyses.

**RESULTS OF INTRAWELL STATISTICAL ANALYSES
BEDROCK-TILL INTERFACE (BTI) WELL MP-274
ABER ROAD FACILITY**

Parameter	Number of Background Observations	Background Percent Nondetect	Background Period	Shapiro-Wilks Test		Distribution Used	Statistical Method*	Prediction Limit (mg/L)
				W Statistic	Critical Value			
Arsenic, Dissolved	12	0	10/10 - 7/14	0.9473	0.805	Original	PPL	0.0039
Barium, Dissolved	8	0	10/12 - 7/14	0.9628	0.749	Original	PPL	0.5
Cadmium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.001
Chromium, Dissolved	38	95	10/97 - 7/14	--	--	--	NPPL	0.0078
Lead, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.005
Mercury, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.0002
Selenium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.015
Silver, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.003

* NPPL = Nonparametric Prediction Limit; PPL = Parametric Prediction Limit;

Note: Outliers were removed prior to conducting statistical analyses.

**RESULTS OF INTRAWELL STATISTICAL ANALYSES
BEDROCK-TILL INTERFACE (BTI) WELL MP-279
ABER ROAD FACILITY**

Parameter	Number of Background Observations	Background Percent Nondetect	Background Period	Shapiro-Wilks Test		Distribution Used	Statistical Method*	Prediction Limit (mg/L)
				W Statistic	Critical Value			
Arsenic, Dissolved	26	0	10/97 - 7/14	0.9609	0.891	Original	PPL	0.045
Barium, Dissolved	8	0	10/12 - 7/14	0.9286	0.749	Original	PPL	1.1
Cadmium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.001
Chromium, Dissolved	35	100	10/97 - 7/14	--	--	--	NPPL	<0.005
Lead, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.005
Mercury, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.0002
Selenium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.015
Silver, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.003

* NPPL = Nonparametric Prediction Limit; PPL = Parametric Prediction Limit;

Note: Outliers were removed prior to conducting statistical analyses.

**RESULTS OF INTRAWELL STATISTICAL ANALYSES
BEDROCK-TILL INTERFACE (BTI) WELL MP-280
ABER ROAD FACILITY**

Parameter	Number of Background Observations	Background Percent Nondetect	Background Period	Shapiro-Wilks Test		Distribution Used	Statistical Method*	Prediction Limit (mg/L)
				W Statistic	Critical Value			
Arsenic, Dissolved	37	0	10/97 - 7/14	0.981	0.914	Original	PPL	0.034
Barium, Dissolved	8	0	10/12 - 7/14	0.7818	0.749	Original	PPL	0.37
Cadmium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.001
Chromium, Dissolved	38	95	10/97 - 7/14	--	--	--	NPPL	0.0084
Lead, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.005
Mercury, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.0002
Selenium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.015
Silver, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.003

* NPPL = Nonparametric Prediction Limit; PPL = Parametric Prediction Limit;

Note: Outliers were removed prior to conducting statistical analyses.

**RESULTS OF INTRAWELL STATISTICAL ANALYSES
BEDROCK-TILL INTERFACE (BTI) WELL MP-281
ABER ROAD FACILITY**

Parameter	Number of Background Observations	Background Percent Nondetect	Background Period	Shapiro-Wilks Test		Distribution Used	Statistical Method*	Prediction Limit (mg/L)
				W Statistic	Critical Value			
Arsenic, Dissolved	12	0	10/10 - 7/14	0.9661	0.805	Original	PPL	0.0041
Barium, Dissolved	8	0	10/12 - 7/14	0.9302	0.749	Original	PPL	0.31
Cadmium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.001
Chromium, Dissolved	38	95	10/97 - 7/14	--	--	--	NPPL	0.0071
Lead, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.005
Mercury, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.0002
Selenium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.015
Silver, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.003

* NPPL = Nonparametric Prediction Limit; PPL = Parametric Prediction Limit;

Note: Outliers were removed prior to conducting statistical analyses.

**RESULTS OF INTRAWELL STATISTICAL ANALYSES
BEDROCK-TILL INTERFACE (BTI) WELL MP-404
ABER ROAD FACILITY**

Parameter	Number of Background Observations	Background Percent Nondetect	Background Period	Shapiro-Wilks Test		Distribution Used	Statistical Method*	Prediction Limit (mg/L)
				W Statistic	Critical Value			
Arsenic, Dissolved	8	0	10/12 - 7/14	0.8956	0.749	Original	PPL	0.0063
Barium, Dissolved	8	0	10/12 - 7/14	0.9271	0.749	Original	PPL	0.44
Cadmium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.001
Chromium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.005
Lead, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.005
Mercury, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.0002
Selenium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.015
Silver, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.003

* NPPL = Nonparametric Prediction Limit; PPL = Parametric Prediction Limit;

Note: Outliers were removed prior to conducting statistical analyses.

**RESULTS OF INTRAWELL STATISTICAL ANALYSES
BEDROCK-TILL INTERFACE (BTI) WELL MP-407
ABER ROAD FACILITY**

Parameter	Number of Background Observations	Background Percent Nondetect	Background Period	Shapiro-Wilks Test		Distribution Used	Statistical Method*	Prediction Limit (mg/L)
				W Statistic	Critical Value			
Arsenic, Dissolved	8	0	10/12 - 7/14	0.8349	0.749	Original	PPL	0.0091
Barium, Dissolved	8	0	10/12 - 7/14	0.9654	0.749	Original	PPL	0.81
Cadmium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.001
Chromium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.005
Lead, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.005
Mercury, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.0002
Selenium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.015
Silver, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.003

* NPPL = Nonparametric Prediction Limit; PPL = Parametric Prediction Limit;

Note: Outliers were removed prior to conducting statistical analyses.

**RESULTS OF INTRAWELL STATISTICAL ANALYSES
BEDROCK-TILL INTERFACE (BTI) WELL MP-408
ABER ROAD FACILITY**

Parameter	Number of Background Observations	Background Percent Nondetect	Background Period	Shapiro-Wilks Test		Distribution Used	Statistical Method*	Prediction Limit (mg/L)
				W Statistic	Critical Value			
Arsenic, Dissolved	8	0	10/12 - 7/14	0.9186	0.749	Original	PPL	0.099
Barium, Dissolved	8	0	10/12 - 7/14	0.9444	0.749	Original	PPL	0.81
Cadmium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.001
Chromium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.005
Lead, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.005
Mercury, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.0002
Selenium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.015
Silver, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.003

* NPPL = Nonparametric Prediction Limit; PPL = Parametric Prediction Limit;

Note: Outliers were removed prior to conducting statistical analyses.

**RESULTS OF INTRAWELL STATISTICAL ANALYSES
BEDROCK-TILL INTERFACE (BTI) WELL MP-409
ABER ROAD FACILITY**

Parameter	Number of Background Observations	Background Percent Nondetect	Background Period	Shapiro-Wilks Test		Distribution Used	Statistical Method*	Prediction Limit (mg/L)
				W Statistic	Critical Value			
Arsenic, Dissolved	8	0	10/12 - 7/14	0.8928	0.749	Original	PPL	0.0039
Barium, Dissolved	8	0	10/12 - 7/14	--	--	--	NPPL	0.12
Cadmium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.001
Chromium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.005
Lead, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.005
Mercury, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.0002
Selenium, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.015
Silver, Dissolved	8	100	10/12 - 7/14	--	--	--	NPPL	<0.003

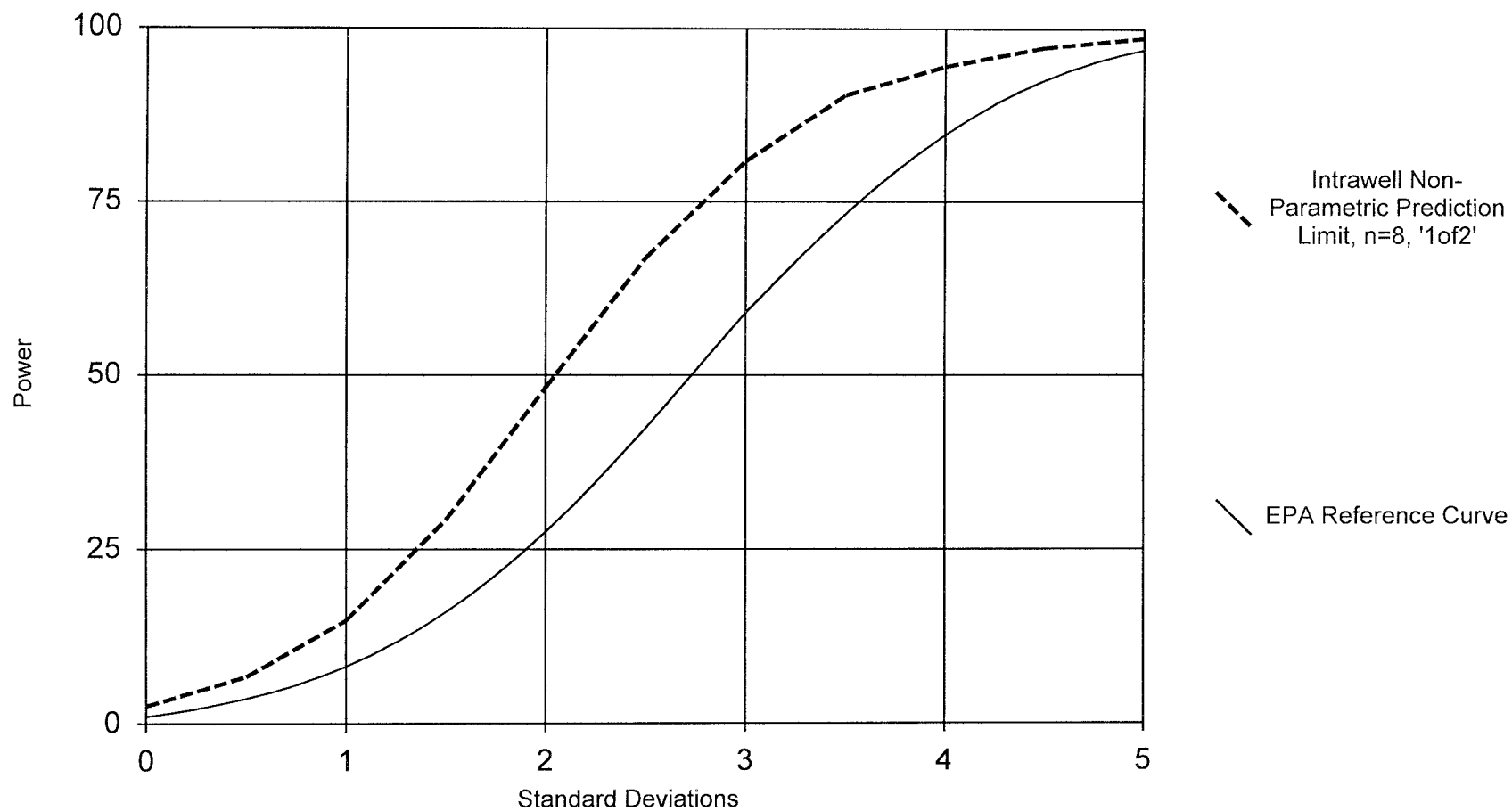
* NPPL = Nonparametric Prediction Limit; PPL = Parametric Prediction Limit;

Note: Outliers were removed prior to conducting statistical analyses.

APPENDIX I

STATISTICAL POWER CURVES

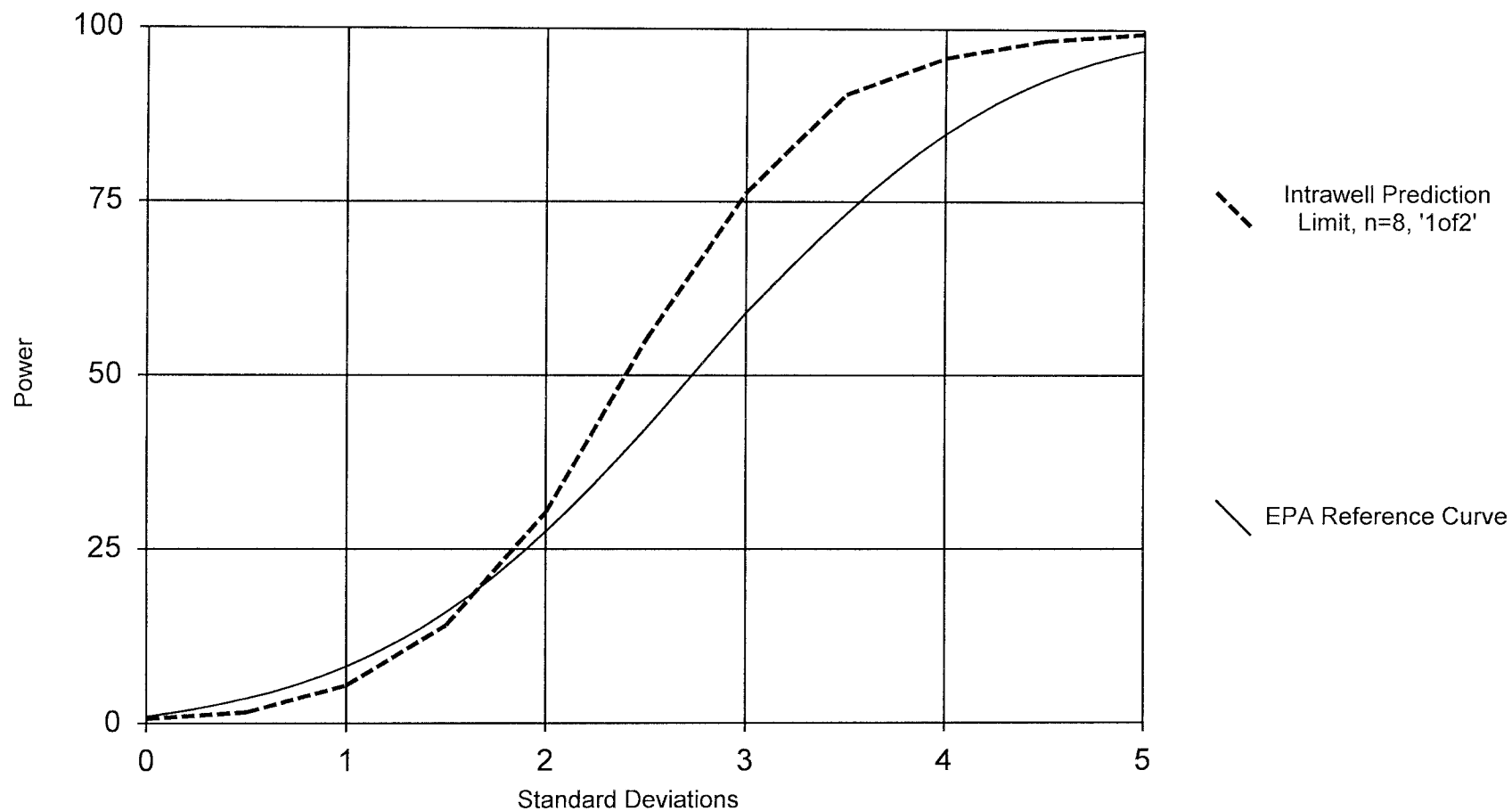
Power Curve



Analysis Run 9/23/2014 2:05 PM View: Stats

Facility: Aber Road Landfill Client: Aber Road Landfill Data File: Aber Road - CS

Power Curve

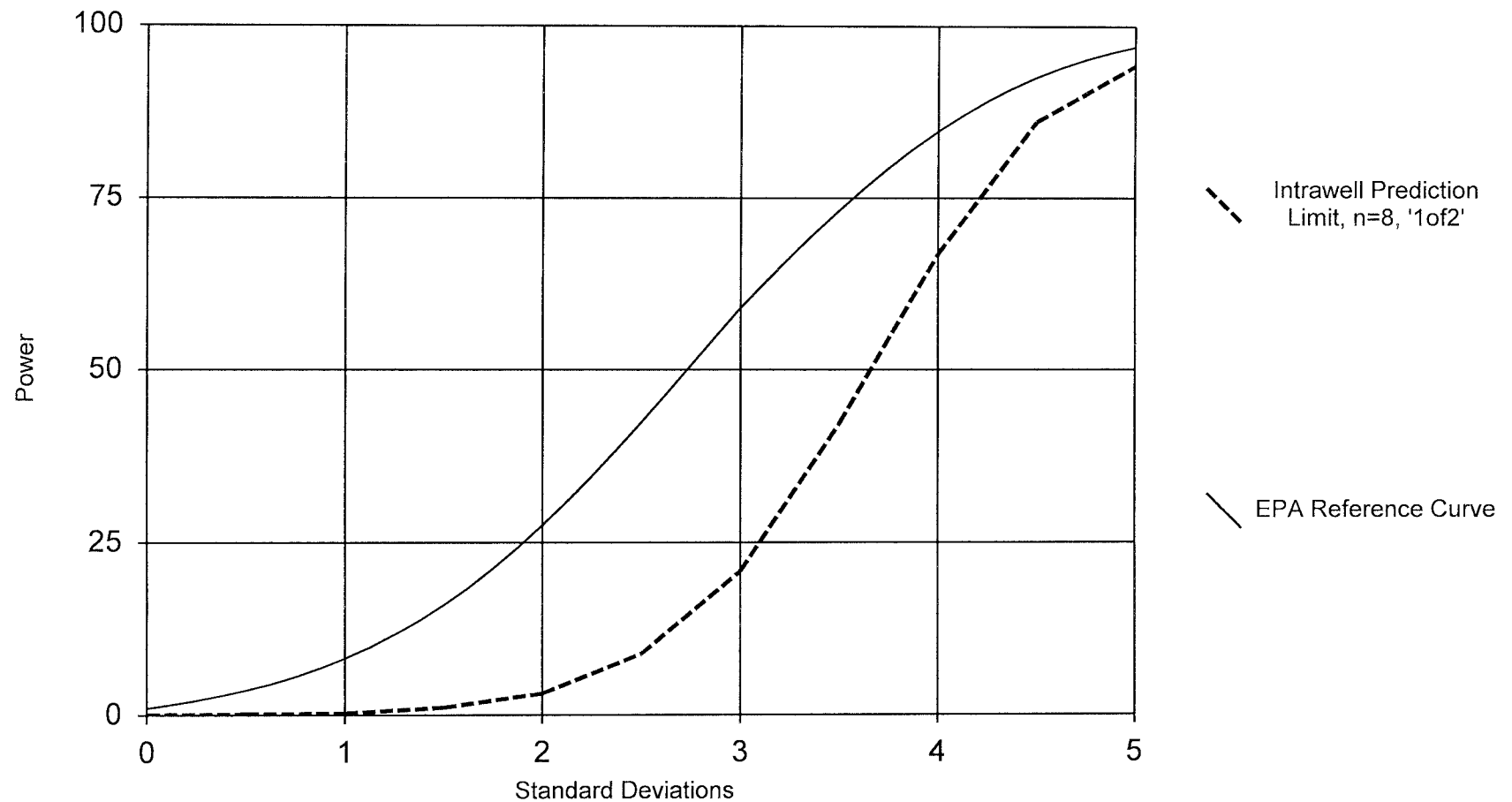


Kappa = 2.312, based on 2 compliance wells and 8 constituents, evaluated semi-annually (this report reflects annual total).

Analysis Run 9/23/2014 2:03 PM View: Stats

Facility: Aber Road Landfill Client: Aber Road Landfill Data File: Aber Road - CS

Power Curve

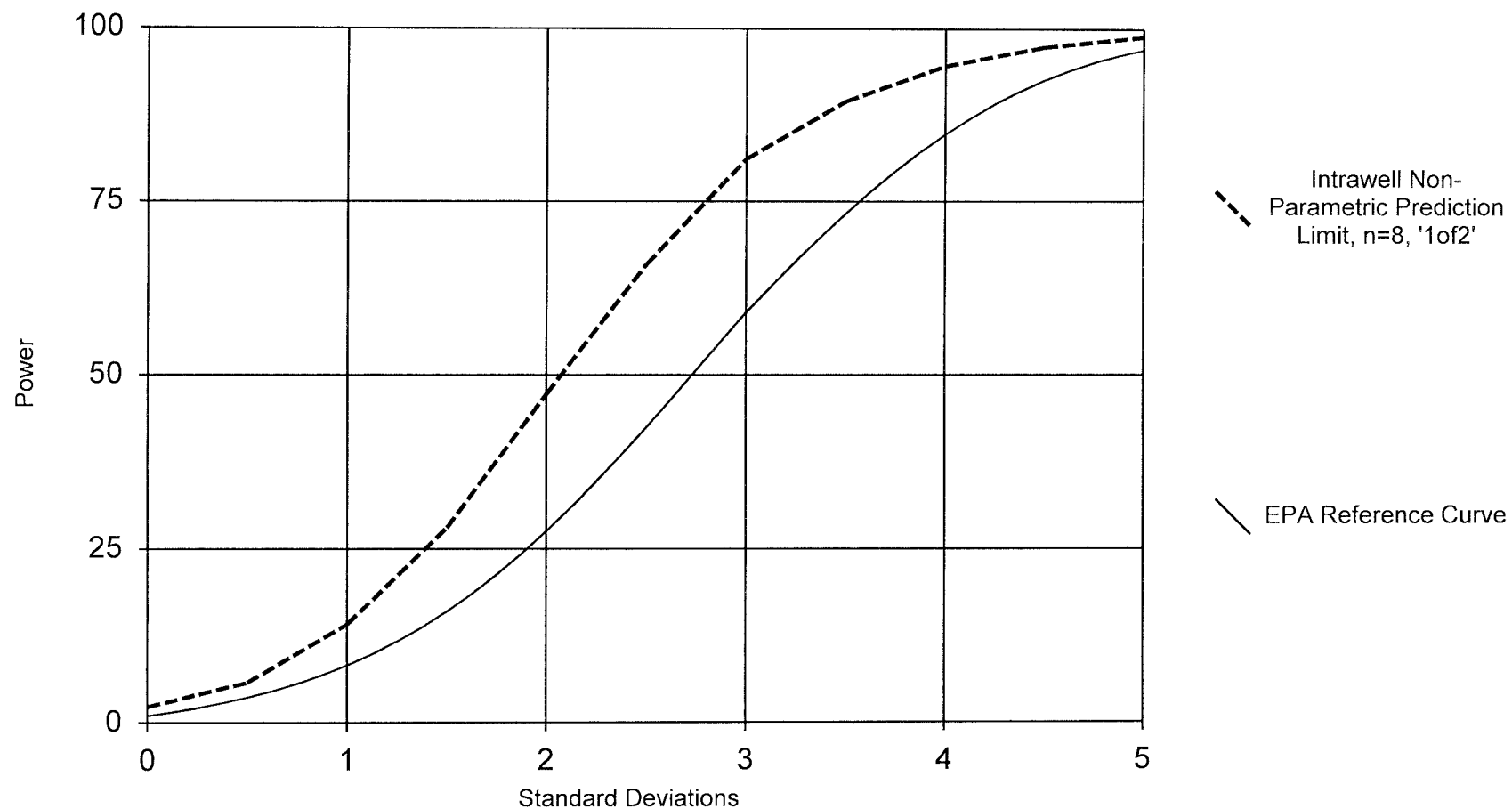


Kappa = 3.524, based on 16 compliance wells and 8 constituents, evaluated semi-annually (this report reflects annual total).

Analysis Run 9/23/2014 2:06 PM View: Stats

Facility: Aber Road Landfill Client: Aber Road Landfill Data File: Aber Road - BTI

Power Curve



Analysis Run 9/23/2014 2:05 PM View: Stats

Facility: Aber Road Landfill Client: Aber Road Landfill Data File: Aber Road - BTI